SECTION 4

CORE SAMPLE ANALYSIS

This section meets the third objective in the monitoring plan for the Denny Way sediment cap, i.e., to document how well the sand cap prevents contaminated sediments from migrating upward. Sediment cores were collected and analyzed to determine whether contaminated sediments remain isolated beneath the cap.

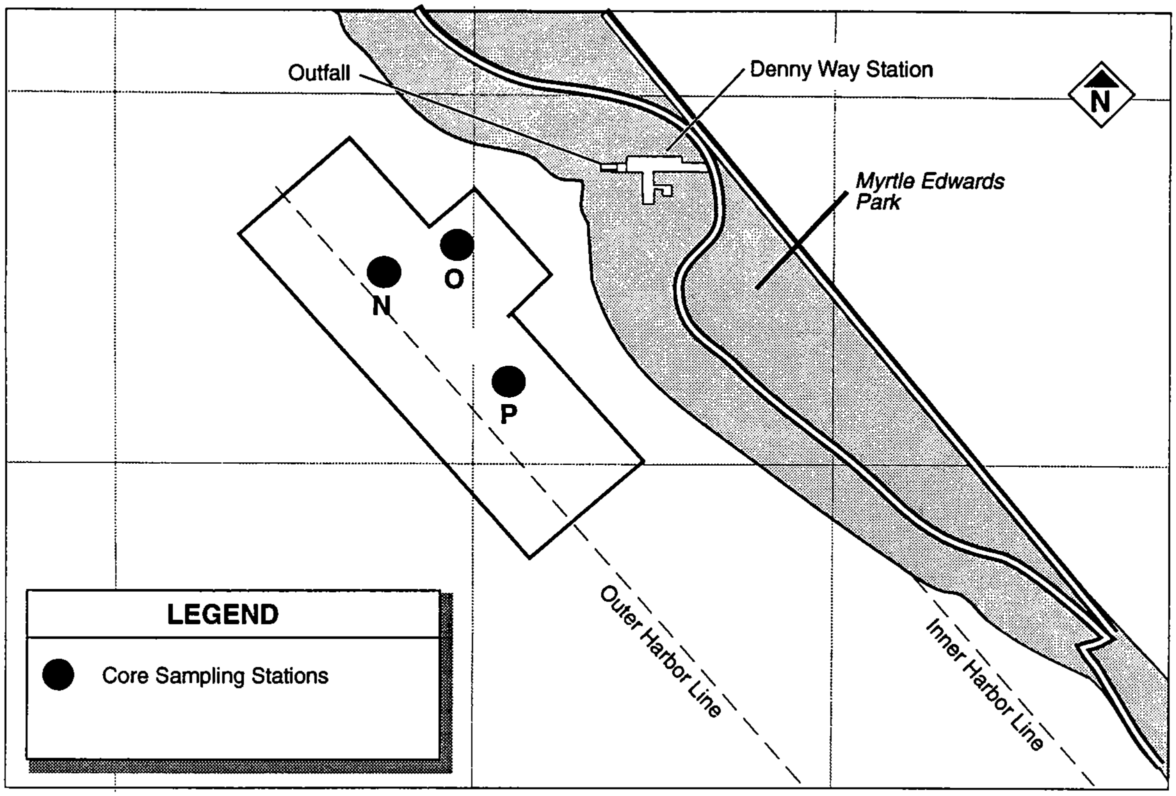
The monitoring plan defined three coring stations, N, O and P, as shown in Map 4-1. The coring stations were located away from other surface sampling locations so that any potential release of contaminated sediment from the core sampling activities would not affect surface samples. The three core stations were under 30 to 50 feet of water.

The first three cores were collected in May 1990, within two months of the completion of the cap. These samples established baseline conditions regarding the distribution of chemicals within the cap. Subsequent core samples were collected in May 1991 and 1992, 1 and 2 years after capping.

The cores were divided into subsamples, which were analyzed for trace metals, pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and other semivolatile organics. Analyses for particle size distribution and percent solids were also performed. Total organic carbon (TOC) analysis was performed to allow comparisons with the Washington State Sediment Management Standards (SMS), which were under development in 1990 when capping occurred.

Two sets of tables and figures appear at the end of this section. The first set of tables (Tables 4-1 through 4-6) show how core characteristics differ from year to year, section to section, and core to core. The second set (4-7 through 4-14) compares results to the SMS.

The figures are vertical profile plots of representative chemicals (Figures 4-3 to 4-15) and illustrate the uniformity found throughout the cap, relative levels of contamination below, within, and on top of the cap, and changes from year to year. Six PAHs, one PCB, and six metals were chosen to be displayed because they were the most predominant; they represented different categories of chemicals; and they best show general characteristics.



Map 4-1. Core Sampling Stations

The compounds and metals chosen for the figures were phenanthrene, anthracene, fluoranthene, pyrene, chrysene, benzo(a)pyrene, Aroclor 1254, cadmium, copper, lead, mercury, silver, and zinc. The scale was individually adjusted for each chemical; the largest concentration found in all 3 years was used to set the scale of the x-axis. The concentration or detection limit was given next to the representative bar. If the chemical was not detected the detection limit was given preceded by a < (less than) symbol.

METHODS

Cores were collected in a joint sampling effort by Metro researchers aboard the *RV Liberty* and contracted scuba divers using a diver support skiff. Location was determined by a shore-based survey crew using a laser theodolite range-azimuth positioning system. The surveyors occupied a known horizontal control point (on top of the outfall structure) and directed the vessel to target sampling locations by monitoring the azimuth by theodolite and range with an electron distance measuring laser reflected off a prism onboard the *Liberty*. The *Liberty* crew set buoys at desired sampling locations and then anchored alongside each buoy with bow and stern anchors. The dive boat tied alongside the *Liberty* for positioning. The scuba diver operated with a surface air supply and was in constant contact with the skiff via closed circuit radio.

Two cores were collected from each of the three stations. In 1990, the scuba diver used a pneumatic rotohammer to drive a 6-foot-long, 4-inch-diameter, thin-walled-aluminum coring tube through the cap and at least 6 inches into the underlying contaminated sediments. For 1991 and 1992 sampling, the diver switched to a pneumatic jackhammer to drive the aluminum coring tube because he was not able to make the rotohammer penetrate the sand after trying for 20 minutes. The core was considered deep enough when about 1 foot of the 6-foot core tube remained above the bottom. Before pulling the core out of the sediments, a rubber screw plug was inserted into the top and a 3/4-inch-diameter rope was tied around the core tube by the diver. The boat crew used a capstan to slowly pull the core out of the sediments. Once the core was free of the bottom, the diver inserted another plug into the bottom of the tube and then it was hoisted onboard the *Liberty*.

Aboard the *Liberty*, the research crew removed the top plug and inserted a tape measure down the core to measure the amount of sediment in the tube. The cores were labeled with a permanent marker to show station number and amount of sediment present. The longest core from each station was chosen as the primary core to be analyzed. The second core was saved as a backup in case there was a problem with the first core, such as insufficient material from under the cap. A siphon hose was used to drain away excess water above the sediments. The top plug was replaced and the cores were stored vertically out of the sun for the rest of the day.

At the end of the day, the cores were transported to the Metro Environmental Laboratory, where they were logged and stored in a walk-in freezer. Later, the aluminum tubes were cut lengthwise with a circular saw equipped with a carbide-tip saw blade. One-half of the aluminum tube was removed. The other half was left to contain the core. After thawing underneath a heat lamp, five 6-inch-long vertical sections were taken from each core, as shown in Figure 4-1. One of the five sections was the 6 inches of contaminated sediments under the cap. The other four sections were from the lower 2 feet of

Methods

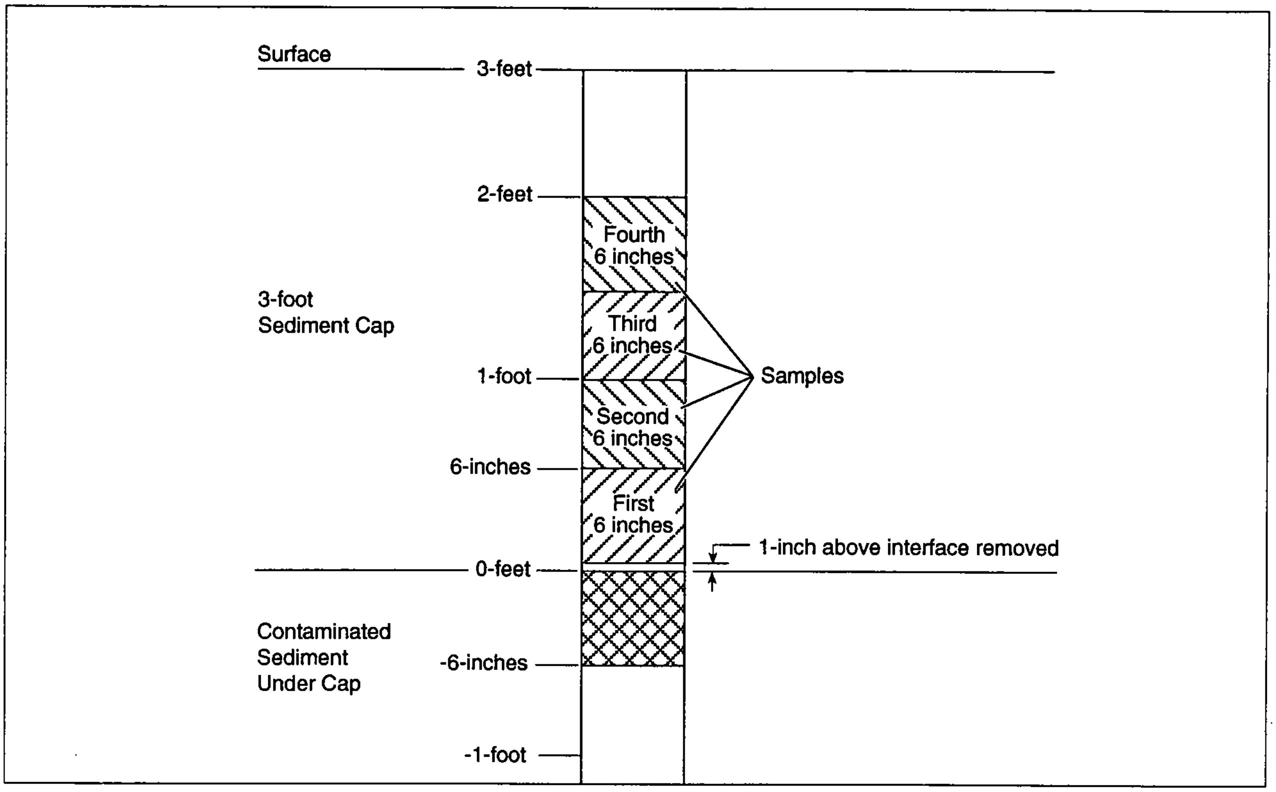


Figure 4-1. Cross Section of Core Samples

the cap. A 1-inch thick band of sediment at the interface between cap sands and underlying muds was discarded to avoid any contaminated sediment mixed into the first cap sample by disturbance during cap placement. Measurements were also made in centimeters for reporting to other agencies.

During core splitting, the outside of each core section was scraped away and only the undisturbed interior sediment scooped out and placed into a clean 4-liter beaker. The material in the beakers was stirred thoroughly and divided into subsamples for pesticides, PCBs, semivolatile organics, and metals analyses. The 1989 Duwamish River pre-dredge samples and the 1990 core and surface samples were analyzed for volatile organics; however, the results are compromised because the sediments had been frozen before analysis.

Metro's Environmental Laboratory used the Environmental Protection Agency and Puget Sound Environmental Program approved procedures for sediment analysis. Quality control (QC) procedures are discussed in Appendix E.

Overall, 57 priority pollutants, 14 additional hazardous substances, 19 pesticides, 7 PCBs, and 16 metals were analyzed and reported.

Semivolatile organics, PCBs, pesticides, and volatile organics were reported as parts per billion dry weight (μg/kg) and metals were reported as parts per million dry weight (mg/kg). Certain semivolatile organics and PCBs were normalized with respect to total organic carbon for comparison to Washington Administrative Code Chapter 173-204 Sediment Management Standards (SMS), Table I, Marine Sediment Quality Standards-Chemical Criteria (SQS), and Table III, Marine Sediment Cleanup Screening Levels (CSL). These values were reported as parts per million carbon or mg/kg organic carbon. Except where noted, the more conservative SQS criteria were used as the basis for discussion, while the results were compared to both criteria in the tables.

1990 RESULTS

For the first year, the monitoring plan required the identification of chemicals in the cap, comparison of within-cap data to pre-dredge data and below-cap conditions, and interpretation regarding the uniformity of the cap. Six semivolatile compounds, one PCB, and six metals were chosen as representative chemicals for vertical profile plots. The following discussion considers all 116 parameters that were analyzed and emphasizes the 13 representative parameters.

The 1990 sediment cores were taken 6 to 8 weeks after cap placement. All five sections of each core were analyzed for trace metals, pesticides, PCBs, and semivolatile organics. The sections were combined into one sample for analysis of volatile organics.

In the following discussion, each core section is labeled with a letter indicating the core (N, O or P) from which it was taken, followed by a number (1 through 4) indicating its position above the cap/bottom interface. For example, the second 6-inch section above the interface in core N is called "N2." The section below the cap will not be noted in a similar fashion but will be referred to as "underlying sediments," "below cap," "contaminated sediments," or similar terms.

Summary

The concentrations of metals and organics were low and nearly uniform throughout the cap, based on chemical measurements in a total of 12 samples from three coring stations. Of 21 organic compounds found below the cap, only six were found anywhere within the cap, except for a section in one core that contained contaminated clay presumably dredged from the Duwamish River. Only trace levels of organic compounds were measured in the cap. Concentrations of metals were also much lower in the cap than in the underlying sediments. All within-cap values were well below the SMS. Some standards were exceeded below the cap, however, at stations N and O. The detection limits for below-cap and within-cap samples exceeded the SMS for some organic compounds, primarily when the dry-weight results were normalized for total organic carbon. Detection limits for metals did not exceed the standards.

Phenanthrene, fluoranthene, and pyrene were the most frequently detected compounds within the cap, found in three-quarters of the sections in trace amounts. Benzo(a)anthracene, chrysene, and benzoic acid were the next most prevalent, found in one-third of the sections. One compound (4-methylphenol), was found within the cap but not in the underlying sediments.

The dry-weight values show a sharp contrast between the within-cap concentrations and those below the cap. All dry-weight PAH concentrations within the cap were lower than the below-cap concentrations by at least one order of magnitude. However, this relationship was not as readily apparent in the TOC-normalized data. Low TOC values in the sand complicated the calculation of TOC-based values and detection limits. Among the PAHs that were detected, the TOC-normalized concentrations within cores N and O were about one order of magnitude lower than in the below-cap sections at those stations. The TOC-normalized concentrations within core P were often higher than below the cap at P. Two factors led to these odd results for TOC-normalized values. First, the dry-weight concentrations below the cap at Station P were the lowest of the three stations. Second, the TOC value for the below-cap sample at P was high; consequently the TOC-normalized values of organic compounds were greatly reduced.

Compared to the below-cap concentrations, concentrations within the cap of 10 reported metals were significantly lower. The other six were either moderately lower or about the same. Of the metals for which there are sediment standards, all within-cap concentrations were much lower than both the SMS and the below-cap concentrations.

Concentrations in the lowest 6-inch section of each core, where migration of contaminants from below the cap would most likely be noticed first, were indistinguishable from those in other cap sections. The removal of a 1-inch section between cap sands and contaminated clays proved sufficient to exclude mixed sediments.

Spatial differences in concentrations of organic compounds and metals were not present within the cap, in marked contrast to the pattern found below the cap. The station nearest the outfall had the most contaminated below-cap sediments, whereas the two stations farther away from the outfall were noticeably less contaminated. With the exception of a 4-inch band of contaminated clay in P3, the cap appears to be homogeneous, clean, Duwamish River sands. Sediment size analysis supports this determination.

Within-Cap Sections

Volatile organics samples for the three cores were run as composites; one gram from each of the five sections of the core was combined into one sample. The entire 5-gram sample was purged and processed by GC/MS techniques. Therefore, the concentrations detected and detection limits were still based on one gram from each of the original samples. Composites were run instead of individual samples because only two volatile organics, acetone and 2-butanone (MEK), were detected in the 1989 pre-dredge analysis of the capping material.

Similarly, the only volatiles detected in the 1990 composites were acetone and MEK. Acetone was detected in all three composites and MEK was detected in one. Acetone and MEK are commonly detected in sampler blanks and are found in most of the volatile organic samples that Metro's Environmental Lab processes. The acetone and MEK contamination might be a result of freezing the sediments prior to splitting or may be from glassware and apparatus at the laboratory.

Only one cap section, the third 6-inch section of core P (P3), displayed concentrations for several chemical compounds approaching those of the underlying contaminated sediments. During core splitting it was noted that this section contained a 4-inch-thick section of clay or soil. The physical characteristics of this clay were much different from the clays underlying the cap; it appeared to be a patch of peat-type material containing evergreen needles dredged up from the Duwamish River with the clean sand. The peat-type material did not have the hydrogen sulfide smell of the under-cap muds. According to barge-track records, the majority of sediments spread over the area surrounding site P were from the last two barge loads. It is possible that as the clean sands were dredged from the Duwamish River, some clays, beneath or near the dredged sands, were mixed in. This anomaly must be recognized so that subsequent results can be interpreted with regard to chemical migration within the cap. This was the only cap section of all three cores where acenaphthene, fluorene, anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo-(a)pyrene, indeno(1,2,3-c,d)pyrene, benzo(g,h,i)perylene and bis(2-ethylhexyl)-phthalate were detected. Concentrations for 10 of the 16 metals were higher here than anywhere else in the cap. The total organic carbon content of this section was very high compared to sand samples, confirming that mud was present. When normalized for organic carbon content, the organics concentrations were quite comparable to the other P sections and none exceeded sediment standards (see Tables 4-7 to 4-9). The detection limits exceeded only two TOC-normalized sediment criteria, relatively few compared to other cap sections.

Except for the section described above, the cap was very clean compared to the underlying sediments. Only six compounds were detected in any of the other sections, and always in trace amounts. Of special note, no compounds were detected at Station O. Benzoic acid was detected in three of the N core sections and the contaminated P section at concentrations approaching below-cap levels, but the concentrations were still lower than the sediment standards. Another substance, 4-methylphenol, was detected in two cap sections (N3 and P3) but not below the cap. The source was probably the Duwamish River sands, since small amounts were detected in the pre-dredge analysis. The concentrations were well below the SMS. The LPAH phenanthrene and the HPAHs fluoranthene and pyrene were sometimes detected at concentrations below, at, or slightly above detection limits. The HPAHs benzo(a)anthracene and chrysene were the only other compounds quantified in any of the cap sections, always below, at, or slightly above detection limits. No PCBs or pesticides were detected in any of the cap sections. No organic compounds were detected in the sections N2, N4, O2, O3, O4, and N4.

Metals in the cap were similarly low relative to the underlying sediments. The highest concentrations for 13 of the 16 reported metals for all cap sections (except P3) were less than the lowest concentrations found in the underlying contaminated sediments. Lead, mercury, and silver demonstrated the sharpest differences in concentrations; the average concentrations of these metals in the below cap sediments were 22 to 35 times higher than the average concentrations within the cap. In contrast, average iron and manganese concentrations were virtually the same in the cap and below the cap. Arsenic, cadmium, chromium, copper, nickel, and zinc levels were significantly lower within the cap sediments while aluminum, beryllium, and selenium were only moderately lower. Antimony and thallium were not detected in any of the cap sections.

Although below-cap samples at Station O were the most contaminated, the O sections of the cap showed no detected organic compounds and the lowest concentrations of metals. Overall, the distribution of contaminants appeared consistently low throughout the cap (excluding P3) and without significant spatial variation.

All detected concentrations were well below the SMS. For non-detected compounds, however, the comparison of detection limits to the SMS was complicated by the low total organic carbon content of the sands. This low organic content meant that the TOC-normalized detection limits for up to 18 compounds exceeded the sediment standards. Detection limits for two compounds, 1,2,4 trichlorobenzene and hexachlorobenzene, almost always exceeded sediment standards. Five sections had detection limits higher than the standards for benzyl butyl phthalate, dibenzofuran, n-nitrosodiphenylamine, PCBs, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-methylnaphthalene, and acenaphthene. Another section's detection limits exceeded standards for all of the above except acenaphthene.

Sediments with low (e.g., 0.1 to 0.2 percent) total organic carbon content often have difficulty meeting the SMS when TOC-normalized. In these instances, it is recommended that the parameters be compared to the dry-weight Apparent Effects Thresholds (AETs). Being mostly sand, one-half of the within-cap samples had organic carbon contents within this range. Of these samples, the detection limits for 1,2,4-trichlorobenzene, hexachlorobenzene, diethyl phthalate, hexachlorobutadiene, N-nitrosodiphenylamine, p,p-DDE and p,p-DDT exceeded the minimum AETs in some cases.

The SMS use dry weight for ionizable organic chemicals that are not controlled by the organic matter in sediments. In these cases, the total organic carbon content is not important and the detection limits are determined by the sample preparation and instrumentation. Among these compounds, the detection limit for 2-4 dimethylphenol almost always exceeded the criteria. The detection limit for 2-methylphenol exceeded the criteria occasionally.

Comparison to Pre-Dredge Data

The types and concentrations of semivolatile organics found in the cap were very similar to the pre-dredge analysis, as expected. Concentration ranges for the pre-dredge analysis were slightly lower than the cap results; this difference might be explained by analytical variations, or it could be the result of material settling onto the to-be-dredged material during the year between analysis and dredging. Phenanthrene, fluoranthene, and pyrene, detected in both the pre-dredge and cap analyses, were the most prevalent in terms of concentration and frequency. Benzo(a)anthracene and chrysene were the next most prevalent in both. Benzoic acid and 4-methylphenol were perceptibly higher in the cap sediments but should not be of concern as both were still well below the SMS. Seven compounds detected in the pre-dredge analysis were not found in any of the cap cores except for the one contaminated with clay.

Arsenic, copper, iron, nickel, and zinc demonstrated higher average concentrations in the pre-dredge analysis than in the cap, while antimony and cadmium had lower average concentrations, and concentrations were in the same general range for lead, mercury, and silver. Of the metals analyzed, all pre-dredge and within-cap concentrations were substantially lower than the concentrations found below the cap.

Particle Size Distribution

Sediment size analysis showed that the cap was composed mostly of sand, in contrast to a mixture of silt, sand, and clay below the cap. Nine of the twelve within-cap sections were composed of more than 95 percent sand and less than 5 percent mud (silt + clay). Two of the remaining three cap sections, N3 and N4, were composed of 90 percent sand and 10 percent mud and 81 percent sand and 19 percent mud, respectively. The section in which mud from the Duwamish River was documented (P3) contained 61 percent sand and 38 percent mud. The three sections with appreciable amounts of mud were also higher in organic carbon content.

The sediments beneath the cap were predominantly silts (50-58 percent) followed by sands (27-41 percent) and clay (7-20 percent). Station O had the most sands of the under-cap samples, presumably because it was closest to the outfall and therefore in the highest-energy environment. Stations N and P had essentially identical sand to mud ratios, but the greater proportion of silts at P and relatively coarser silts at N suggest that N is a slightly higher-energy environment.

Below the Cap

Eighteen semivolatile organic compounds and one PCB were detected in the contaminated sediments below the cap, but not all compounds were present at each station. Most of the pollutants detected below the cap were detected at concentrations much higher than the detection limits. No pesticides were detected below the cap.

The distribution of organic pollutants below the cap appeared to be related to distance from the outfall, and to a lesser degree, direction away from the outfall. The station closest to the outfall, Station O, had the highest concentrations for all compounds except Aroclor 1254. Concentrations at Station O were usually two to five times higher than concentrations at the next most contaminated site, Station N. Station N exhibited the highest concentrations of Aroclor 1254 and the second highest concentrations for most other compounds. Generally, Station P appeared to be the least contaminated. Stations N and P are roughly the same distance from the outfall, but Station N is in the northern half of the cap and Station P is to the south. There appear to be more chemical occurrences and higher concentrations toward the north; this pattern was also observed in samples collected in 1986 before capping (Romberg et al. 1987).

The distribution of metals below the cap was variable, but two dominant patterns emerged. For seven metals (antimony, cadmium, copper, lead, mercury, silver, and zinc) the distribution pattern was the same as that described for organics: high concentrations at Station O and significantly lower concentrations at Stations N and P, with less at P than N.

The other pattern, for nine metals, was almost the opposite: lowest at Station O, highest at either Station N or P. Because of many variations this pattern was less distinct. Aluminum, iron, nickel, beryllium, and selenium were all lowest at Station O. Interestingly, both arsenic and chromium were highest at Station P and lowest at Station N. Thallium was below the detection limits in all three cores' below-cap sections.

Aluminum, iron, and manganese are not pollutants but are metals abundant in the earth's crustal soils and indicate the presence of mud. Higher concentrations of these metals were found at offshore stations, where there is more mud, and lower concentrations were found at the sandier inshore stations.

Values for total PCBs exceeded the SQS at Stations N and O. Mercury, silver, and bis (2-ethylhexyl) phthalate exceeded the CSL at Stations N and O. Benzoic acid exceeded the CSL at Station O. Station O also exceeded the SQS for fluoranthene, chrysene, both benzo fluoranthenes, total HPAHs, benzyl butyl phthalate, benzoic acid, and lead. No criteria were exceeded at P. The organic content of all three below-cap samples was high enough for the chemical criteria to be reliable tests of the potential toxicity of the sediments.

Previous studies found similar relationships. The Denny Way toxicant reduction study (Metro 1987) found the highest concentrations approximately where Station O is located, with steep concentration down-gradients seaward and to the north and south (see Figure 4-2). While the contaminant profile was essentially the same, the concentrations found in the toxicant reduction study were usually higher than those found in the below-cap core section. This suggests that contaminant degradation or natural recovery may have occurred, or that the most contaminated muds were not recovered in the cores, a sampling artifact discussed in more detail later in this report.

1991 RESULTS

The monitoring plan required that during subsequent years of monitoring apparent chemical increases in the cap be identified and compared to underlying sediments. Also, comparisons were to be made to Puget Sound Sediment Standards if the levels became significantly elevated. The following discussion details all changes found within and below the cap and compares the findings to the newly adopted SMS.

In 1991, semivolatile organics, pesticides, PCBs, and metals analyses were performed on only the below-cap and first 6-inch sections for all cores. The second, third, and fourth 6-inch sections were kept frozen in storage until it was decided that they would not need to be analyzed. Based on early examination of the data, those sections were not analyzed because there was no indication of chemicals migrating up into the first 6-inch core sections. Volatile organics were not analyzed because none had been detected in previous years except the two considered sampling artifacts.

The procedure for analyzing arsenic, antimony, selenium, and thallium changed from graphite furnace in 1990 to ICP in 1991. As a result, the detection limits for these metals became higher. Antimony, selenium, and thallium were not detected within the cap and are not sediment criteria metals, so this change was not significant. Arsenic is of concern as a sediment standards metal, but the ICP detection limits remained below the criteria.

Summary

Data from the three cores indicates that very little if any migration from the underlying contaminated sediments into the cap sands occurred. A phthalate, some PAHs and three PCBs had higher values in one section, N1. The total PCBs in N1 were above the SMS. Mercury, silver, and chromium were higher in this same section. At the other two stations, some PAHs and two metals were slightly higher. Although detection limits in 1991 were substantially lower than in 1990 for most organic compounds, the low total organic carbon content of the sands continued to make comparison to the SMS difficult.

The vertical profile plots of representative compounds and metals demonstrated three points: first, concentrations in the below-cap section were much lower in 1991; second, concentrations within the cap are low and similar to those observed in 1990; and third, the surface is being recontaminated. Further discussion of surface conditions is presented in Section 5.

The concentrations of most organic compounds below the cap were much lower in 1991 than 1990. Among compounds, only di-n-butyl phthalate, bis(2-ethylhexyl)phthalate, and three Aroclors were higher in concentration. The higher results were observed at Station P. The highest concentrations of PAHs were still found at Station O, but the highest concentrations of most metals and all PCBs switched to Station P. The concentration of total PCBs in the P core was by far the highest observed in this study.

The large drop in PAH concentrations in the below-cap samples in all three cores was probably due to a sampling artifact. Cores had to be jackhammered in 1991 instead of rotohammered, because the core tube was not able to penetrate through the sand cap. Less-contaminated underlying sediments may have been collected because of this change in sampling method.

Within-Cap Sections

Changes, mostly minor, occurred in the within-cap sections N1 and P1. The changes were probably the result of lower detection limits, sampling and analytical variability, and possible laboratory contamination, but migration must also be considered.

High concentrations of bis(2-ethylhexyl)phthalate and lower concentrations of eight other compounds that had not been detected in N1 before were detected in the 1991 samples. However, much of the apparent bis(2-ethylhexyl)phthalate contamination may be the result of contamination at the laboratory, since this compound is found in some of the plastic lab apparatus, reagents, and containers. Bis(2-ethylhexyl)phthalate's TOC-normalized concentration of 33 ppm was below the SMS (see Table 4-10). The emergence of acenaphthene, fluorene, and anthracene was likely due to lower detection limits. The appearance of benzo(a)anthracene and chrysene along with the increases of fluoranthene and pyrene may indicate some migration of contaminants; these are probably the result of analytical or sampling variation, however, and are therefore nonsignificant. The appearance of three PCBs was likely due to much lower detection limits, but it could also be attributed to the "patchy" distribution the Aroclors have demonstrated in prior studies. A patchy distribution is defined as the failure "to show any consistent distribution pattern" (Romberg et al. 1987). The total concentration of PCBs was above the SQS but below the CSL.

In P1, phenanthrene, fluoranthene, pyrene, and chrysene values were higher than the previous year. The differences were minor, however, less than 22 ppb dry-weight, and were most likely due to normal sampling and analytical variability.

Mercury values were higher in Section N1, approaching the SQS. Silver and chromium increased but remained lower than the below-cap values and sediment standards. All other metals values in N1 were within or lower than the ranges defined by the within-cap 1990 values. When compared to Sections O1 and P1 in 1991, N1 had the highest values for beryllium, chromium, copper, mercury, and silver, but most of the differences were minor.

The only other noteworthy changes were demonstrated by arsenic and beryllium in O and P. Arsenic values more than doubled to be within the range of concentrations found below the cap, yet stayed well below the sediment criteria.

Otherwise, Sections O1 and P1 were virtually unaltered from the year before. Despite even lower detection limits, no chemical compounds were detected in O1, so it remained the core section with the lowest concentrations. The concentrations of all other metals changed little. Pesticides and PCBs remained undetected in both. The only within-cap value that exceeded the sediment standard was that for total PCBs in N1.

The dry-weight detection limits were lower in 1991 than 1990 for all chemical compounds, including PCBs and pesticides. The only dry-weight detection limits to exceed the sediment standards were for 2,4-dimethylphenol.

The dry-weight detection limits were very consistent from core to core, while the TOC-normalized detection limits varied considerably.

The 1991 TOC-normalized detection limits were slightly higher than 1990 limits for the semivolatile organics in N. TOC-normalized detection limits were lower in 1991 than 1990 for the PCBs in N and for all compounds in O and P. The TOC-normalized detection limits continued to be problematic because of low organic carbon content. Detection limits exceeded the criteria for 1,2-dichlorobenzene, 1,2,4-trichlorobenzene, hexachlorobenzene, and hexachlorobutadiene in all three sections. Section P1 detection limits also exceeded the criteria for dibenzo(a,h)anthracene, 1,4-dichlorobenzene, benzyl butyl phthalate, dibenzofuran, and n-nitrosodiphenylamine. Section O1 detection limits exceeded all of the above criteria and 2-methylnaphthalene.

Below the Cap

The below-cap concentrations of two phthalates and three Aroclors were higher in 1991 at Station P. Di-n-butyl phthalate, detected for the first time anywhere, was found within the range considered contamination from laboratory procedures and was far below the SMS. Bis(2-ethylhexyl)phthalate was lower at Stations N and O but was higher at P. The concentrations at Stations O and P (150mg/kg carbon for both) exceeded the SMS. Interestingly, the concentrations of benzyl butyl phthalate and dibenzofuran were lower while benzoic acid went undetected altogether, despite better detection limits. Eventhough they were lower, benzyl butyl phthalate still exceeded the SMS at Station O.

Two compounds were analyzed in 1991 that were not analyzed in 1990, coprostanol and Carbazole. A small amount of Carbazole was detected in one under-cap sample, while coprostanol was not detected.

Compared to the previous year, below-cap levels of Aroclor 1254 were lower at Stations N and O but higher at Station P. Aroclor 1260 was found in all three below-cap samples for the first time, as well as Aroclor 1248 in the below-cap samples from Stations O and P. The concentrations of all three PCBs were about five times higher at Station P than at N or O. The total amount of PCBs exceeded the SMS at all three stations.

Antimony and selenium detection limits were higher than the concentrations observed in 1990 because of a change in method. Thallium was not detected in 1990, but, despite the higher detection limits in 1991, it was detected at Station P. The analysis of arsenic was not affected by the change.

Of the detected metals, all except aluminum, arsenic, and nickel were higher at Station P. Station P had the highest concentrations of the 1991 below-cap samples for all detected metals except arsenic and beryllium. Below-cap concentrations of mercury exceeded the sediment standards at all three stations, while silver exceeded the standard at Station P. Overall, the average concentrations in below-cap samples tended to be lower in 1991 than 1990 but most of the differences were minor.

Why PAH Concentrations Were Lower in the Below-Cap Samples

There were many possible causes for the lower concentrations of PAHs in the 1991 below-cap samples: positioning errors, dilution by cap material, patchy distribution, chemical degradation, bioremediation, or sampling procedure.

Historically, PCBs have demonstrated a seemingly random distribution of concentrations. PAHs, on the other hand, have shown a fairly recognizable pattern of decreasing with distance from the outfall. The distribution of PAHs in 1991 continued to follow this pattern despite sharp overall decreases in concentrations. Therefore, it is unlikely that the changes in PAH concentrations were the result of patchy chemical distribution.

Chemical degradation of the PAHs was suspected but unlikely because the metal concentrations also decreased, indicating lower concentrations of both chemical groups. Microbial activity can degrade organic compounds but would not affect metals.

The most likely explanation is that the 1991 core sampling procedure may not have collected the most contaminated portion of the below-cap sediments. The method of driving the core tube was changed from rotohammer to jackhammer because the rotohammer was having difficulty. It is possible that the cap sands plugged the core tube as it was being driven into the cap sands. The plugged core tube then forced aside the upper, most contaminated layer of mud before capturing a firmer, less-contaminated mud substrate below. This sampling artifact may have been caused by more compacted cap sands or it could be the result of the rougher motion of the jackhammer.

1992 RESULTS

All sections of the N and O cores were analyzed for semivolatile organics, PCBs, pesticides, and metals in 1992. Analysis of the 1992 P core was limited to the below-cap and first 6-inch sections. Replicate cores for N and O were taken and the below-cap and first 6-inch sections were analyzed for the same parameters. In addition, the second 6-inch section of the replicate O core was analyzed. Volatile organics were not analyzed because they had not been observed in previous years' samples.

Since this was the second time that the second, third and fourth 6-inch sections of the cores were analyzed, additional comparisons could be made based on the range of "background" conditions established by the 1990 cores.

Summary

The 1992 data show no indication that organic compounds and metals are migrating from the underlying sediments into the cap after 2 years. The sharp interface between the cap sands and the underlying sediments was again evident in all core samples. Fluoranthene and pyrene were the only chemical compounds detected in the cap with regularity, usually at trace, background levels. Antimony and thallium were detected for the first time, in every within-cap section analyzed.

In 1992, Section O4 had moderately higher PAH concentrations than in 1990. The higher values are attributed to mud found in the sample. The mud may be from surface sediment, because the core contained less than 2 feet of sand and the fine material was found on top of the sand. The cap material appears to be only about 2 feet thick in this area.

No other within-cap section of any of the three cores had significantly higher values. The O1 replicate showed higher values, but this was because this sample contained the peat-type material that was dredged along with the capping sand from the Duwamish River. The replicate samples for N1, and O2 did not differ noticeably from the primary samples.

The higher values observed in N1 in 1991 were reversed in 1992. Bis(2-ethylhexyl)phthalate, PCBs, mercury, silver, and chromium concentrations were back to 1990 levels, if they were detected at all. This suggests that some of the below-cap muds may have been present in the 1991 N1 sample.

Below the cap, concentrations of PAHs in the primary and replicate samples from Stations N and O were similar to 1991 concentrations at these stations. PAH concentrations at Station P were comparable to the 1990 Station P concentrations, which were higher than 1991. As a result, the typical spatial distribution found in prior years of higher concentrations closest to the outfall was not observed in 1992. Station P concentrations were often the highest, followed closely by Station O.

The organic-carbon content was higher in 1992 for many within-cap sections, causing the TOC-normalized values and detection limits to be lower in general. All compounds or metals within the cap were well below the SMS. Below the cap, mercury, silver, bis(2-ethylhexyl)phthalate, and total PCBs exceeded the standards on occasion. Some detection limits continued to be higher than the criteria, but, in general, both dry-weight and TOC-normalized detection limits were lower than in previous years.

Within-Cap Sections

Fewer compounds were detected in N1 and the N1 replicate in 1992 than in 1991, with comparable detection limits. Of special note, the bis(2-ethylhexyl)phthalate concentration was much lower, which confirms that the 1991 concentration was probably laboratory contamination or that a small amount of below-cap mud was present in the 1991 sample. Only one PCB was detected, further supporting the assertion that the presence of Aroclors was "patchy" or random. The 1992 dry-weight detection limits for PCBs and pesticides were about twice as high as the 1991 limits, but the 1992 PCB detection limits were still lower than the actual 1991 concentrations. The high concentration of mercury found in 1991 does not appear to be a problem because 1992 concentrations were lower than the overall 1990 average. Concentrations in the N1 section and its replicate were very similar. Arsenic, antimony, and thallium were the only metals found at concentrations higher than concentrations in other within-cap samples. The concentrations of all other metals in N1 and its replicate were either about the same or below other within-cap concentrations.

Small quantities of PAHs, two phthalates, and benzoic acid were found in N2 and N3. No pesticides or PCBs were detected in either of these sections. There were a few more compounds detected in N2, which might be attributed to lower detection limits. The higher concentrations and number of compounds detected in N3 in 1992 was probably the result of a large amount of natural, decomposed organic debris that was observed in the N3 section during the core cutting. The

1992 dry weight detection limits for all semivolatile organics, pesticides, and PCBs in Sections N2, N3, and N4 were lower than the 1990 detection limits. Of the compounds detected in 1990, none of the concentrations was significantly higher, and several were lower. The compound 4-methylphenol, which had been detected in N3 in 1990, was not detected in 1992, although the detection limit was lower.

No semivolatile organics, pesticides, or PCBs were detected in N4. The absence of detected compounds suggests that there has not been any migration or disturbance by burrowing from the surface at this station.

Arsenic, antimony, beryllium, and thallium were the only metals in the N core sections with higher concentrations than the range defined in 1990. The arsenic concentrations were higher than 1990 values in all N core within-cap sections yet stayed below the under-cap concentrations and far below sediment management criteria. The antimony and beryllium changes were minor.

Antimony concentrations ranged from 1.2 ppb to 2.8 ppb, less than three times higher than the 1990 detection limit. Thallium concentrations ranged from 9.3 ppm to 16 ppm, roughly a factor of 10 higher than the 1990 detection limit. In every section, the arsenic concentrations were higher than the background levels established in 1990, but still lower than the below-cap levels and much lower than the SMS. Antimony, arsenic, and thallium were analyzed by graphite furnace techniques in 1990 and ICP in 1992. The procedural change may be responsible for these apparent changes.

The regular and replicate samples from Sections O2 and O3 and the regular sample from O1 continued to be void of detectable levels of semivolatile organics, pesticides, and PCBs. The semivolatile organics' dry-weight detection limits were virtually identical to the 1991 limits and somewhat lower than the 1990 limits. As in the N core samples, antimony, arsenic, and thallium were found at levels higher than the 1990 ranges. All other metals were below or within the ranges. Selenium remained undetected.

Several PAHs were higher in Section O4. One PCB was detected at a value lower than the detection limit. Again, antimony, arsenic, and thallium were higher than the expected range. Silver was also higher than the range observed in 1990, but still lower than the below-cap levels and the SMS.

The increased values in O4 were from contaminants on the surface, which is being recontaminated (discussed in more detail in Section 5). The O core and O core replicate contained only 22 inches of sand, so the cap may be less than 2 feet thick at this station. The O4 section that was analyzed contained 3 inches of material: one-half inch of peat at the bottom of the section, one-and-one-half inches of sand in the center, and one inch of fine material on the top. The fine material, found on the top of the core section, was most likely distributed onto the cap between 1990 and 1992 and probably contains the most contaminants. The surface grab sample (Station K) associated with core Station O has experienced the most recontamination since capping of the four surface stations. The vertical profile plots show that concentrations of representative metals and chemical compounds in O4 were slightly higher than the other O sections but lower than the 1992 surface-grab concentrations at Station K. This supports the observations that the O4 sample was a mixture of surface fines and cap sands, and that the cap sands were relatively clean.

Only the first 6-inch section of the P core within-cap sections was analyzed. Two PAHs were found at typical levels. Antimony, arsenic, and thallium were the only metals at concentrations greater than the background range. Overall, the cap continued to isolate contaminants at this site.

Below Cap

Dry-weight concentrations of PAHs in the below-cap samples from the two cores at N and the two cores at O were similar to the 1991 concentrations at these stations and lower than the 1990 concentrations. At Station P in 1992, dry-weight concentrations of PAHs were higher than the 1991 concentrations and similar to the 1990 concentrations. Changes in phthalates, other semivolatiles, and PCBs were random. Most metals concentrations were similar to 1990 and 1991. Selenium was detected for the first time in all the below-cap samples.

Because under-cap concentrations at P were higher in 1992, values for mercury, silver, bis(2-ethylhexyl)phthalate, and total PCB concentrations exceeded the SMS at Station P (see Tables 4-11 to 4-14). The regular and replicate N samples exceeded the criteria for mercury, bis(2-ethylhexyl)phthalate, and total PCBs. The Station O and O replicate below-cap samples did not exceed any criteria.

The SQS for 2,4-dimethylphenol (dry weight) was exceeded by the detection limits for all below-cap samples. The TOC-normalized SQS for hexa-chlorobenzene was exceeded by detection limits at the N and N replicate below-cap samples.

Dry-weight concentrations of PAHs in core N and the core N replicate were slightly lower than, similar, or slightly higher than concentrations found in the 1991 N core. All were lower than 1990 N core concentrations. The frequencies, types and concentrations of other semivolatile organics detected in 1992 in N were within the very broad ranges found the 1990 and 1991 data. Total PCB dry-weight concentrations were higher than the 1991 total because of the appearance of Aroclor 1248, but still lower than the 1990 total, which was solely dependent on the Aroclor 1254 concentration. When TOC-normalized, the concentrations of PAHs, phthalates, other semivolatiles, and PCBs were higher in the replicate than the regular sample, which is the result of a lower organic carbon content in the replicate. The aluminum and nickel concentrations in the N replicate were the highest yet observed in this study.

The regular O core and the replicate were similar to each other and the 1991 concentrations for most chemical compounds and metals. The only tangible differences (less than 50 percent variability) were for fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-c-d)pyrene, dibenzo(a,h)anthracene, benzo-(g,h,i)perylene, Carbazole, Aroclor 1254, and lead. Given the nature of sediments and the coring method, these differences were not unreasonable. All of the analyses still showed substantial contamination below the cap and a sharp contrast to the cap. After TOC-normalization, concentrations in the regular and the replicate were very similar to each other, yet much different from 1991 concentrations because the total organic carbon content in 1992 was much higher. No compounds or metals exceeded the sediment standards in either 1992 Station O sample. The detection limits for 2,4-dimethylphenol did exceed the standards.

Only one core was taken at Station P. Unlike the cores taken at N and O, the P-core below-cap PAH concentrations were more like the 1990 concentrations than the 1991 concentrations. This meant that many 1992 P-core concentrations were higher than the N- and O-core concentrations, changing the appearance of the relative distribution. Furthermore, naphthalene, acenaphthylene and Carbazole were detected for the first time in a P-core sample. Di-n-butyl phthalate was not detected this year, but the bis(2-ethylhexyl)phthalate was much higher than before. By dry weight and TOC-normalization, the Aroclor concentrations were much lower than 1991 but were still among the highest observed in this study. Metals concentrations were within ranges defined by all stations in 1990 and 1991 and similar to previous findings at P.

Cap material exhibited mostly uniform, low concentrations of semivolatile organics and metals. The only exceptions were the elevated concentrations found in P3 in 1990 and the O1 replicate in 1992, which were determined to contain clay presumably dredged from the Duwamish River. A distinct interface between the bottom of the sand cap and the underlying contaminated muds was apparent from chemical and metal concentrations and from visual inspection of the cores. Removal of a one-inch-thick section between the muds and sands proved sufficient, indicating that contaminated muds were not mixed to any great extent with cap sands during capping. There is no evidence of chemicals or metals migrating from the contaminated sediments into the cap.

FIGURES AND TABLES

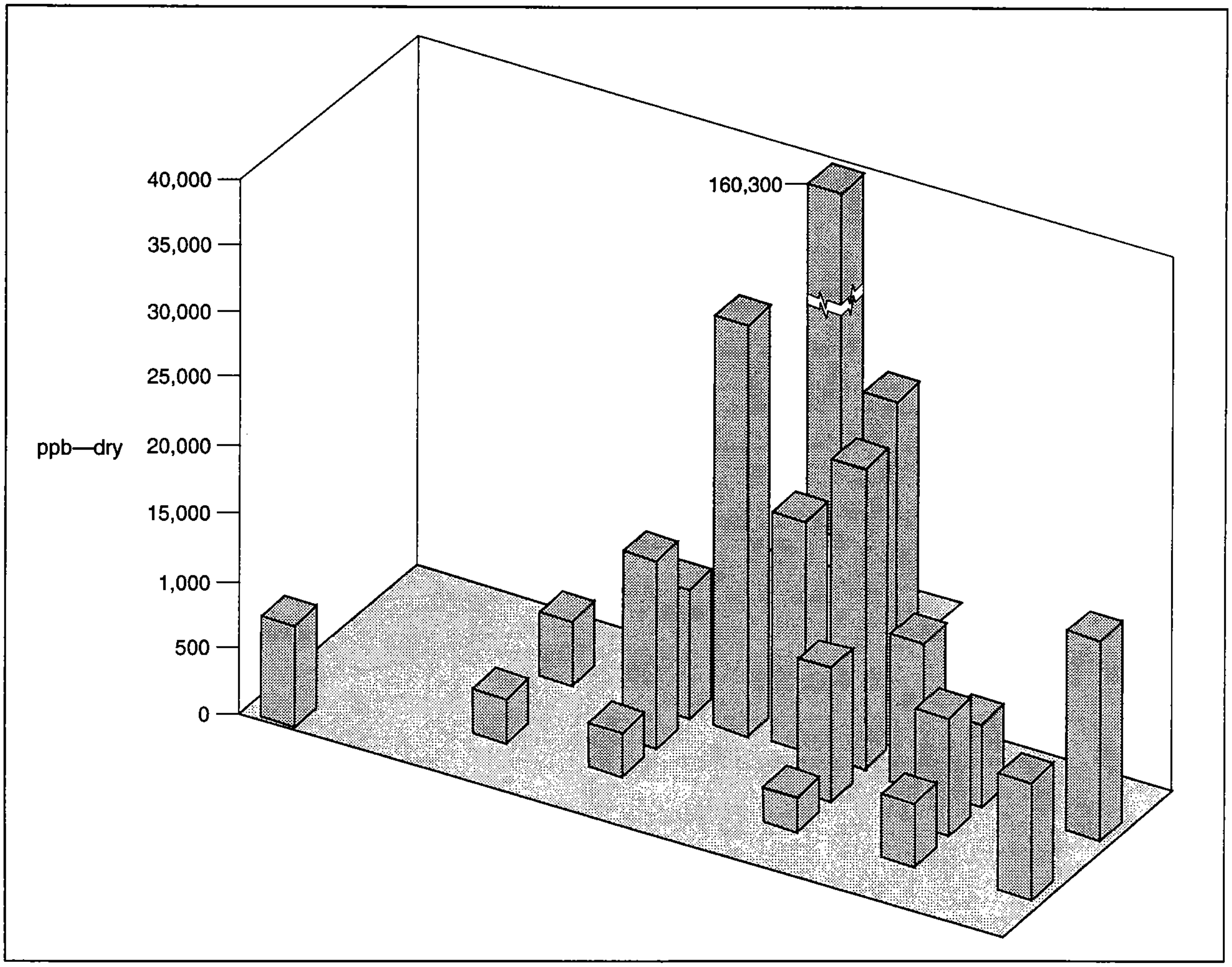


Figure 4-2. Pre-Cap Total HPAHs

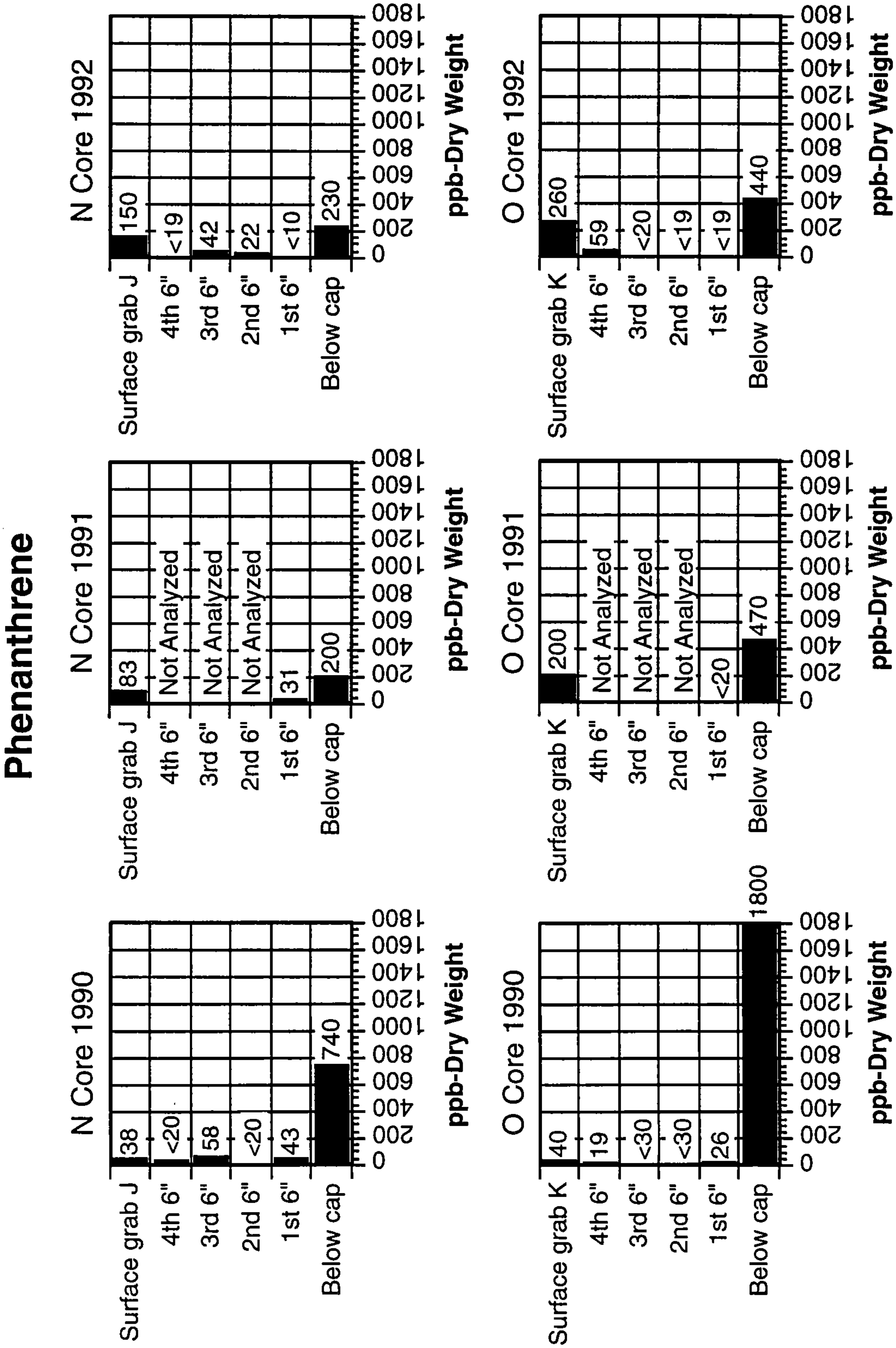


Figure 4-3. Phenanthrene

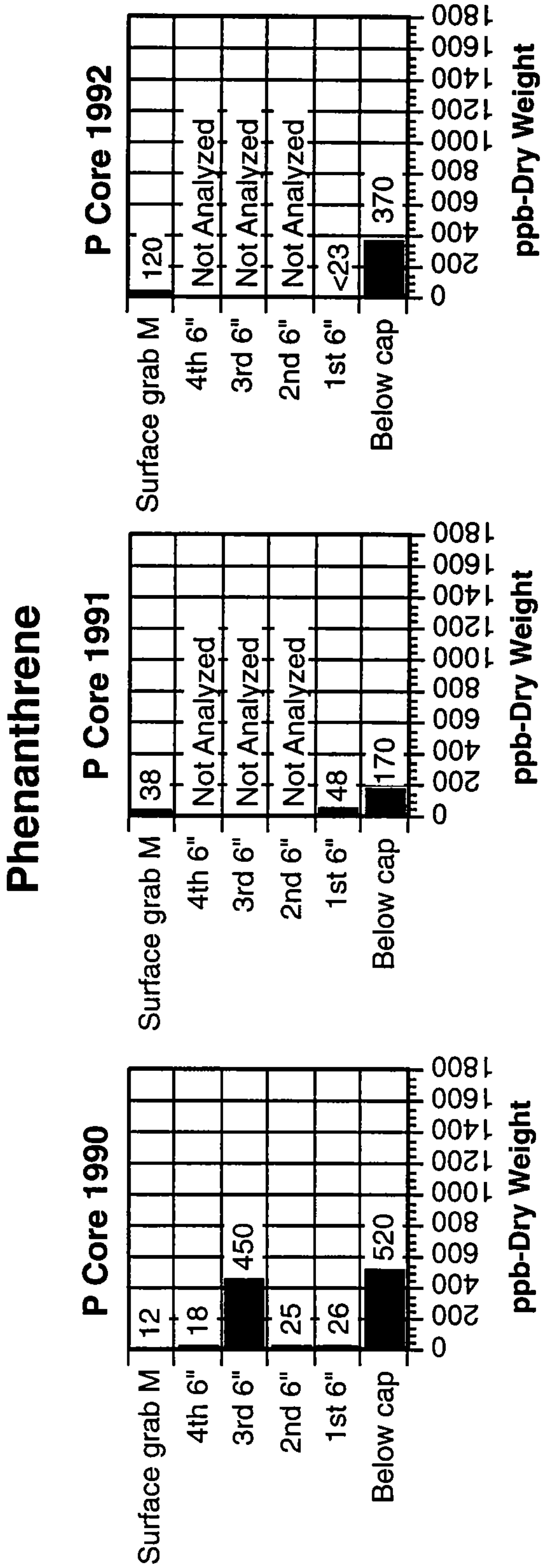


Figure 4-3. Phenanthrene *continued*

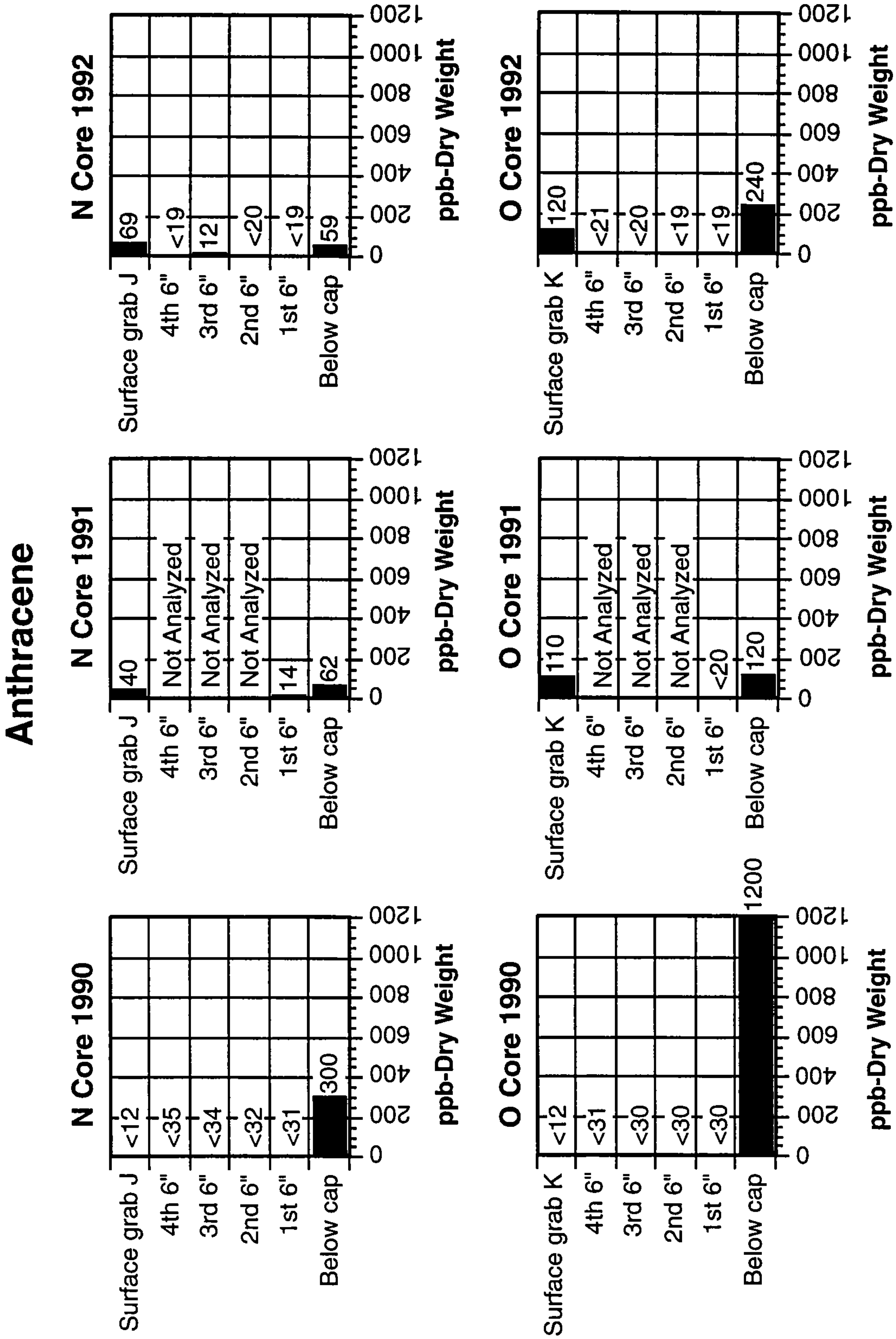


Figure 4-4. Anthracene

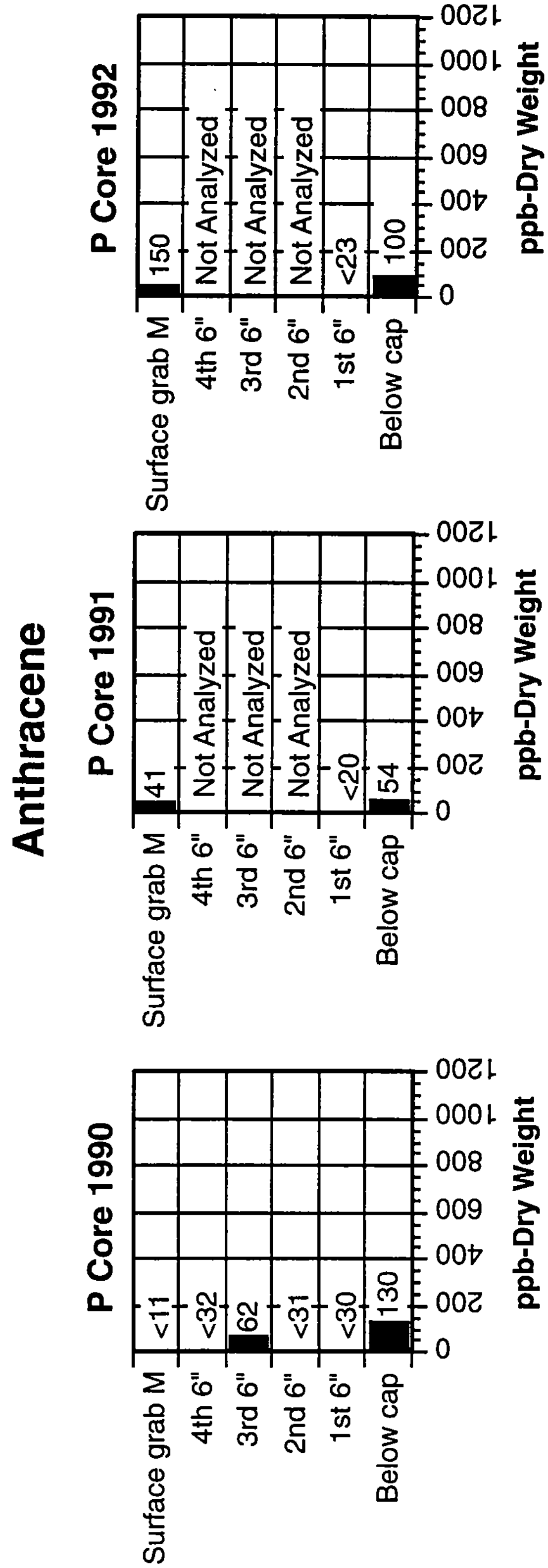


Figure 4-4. Anthracene *continued*

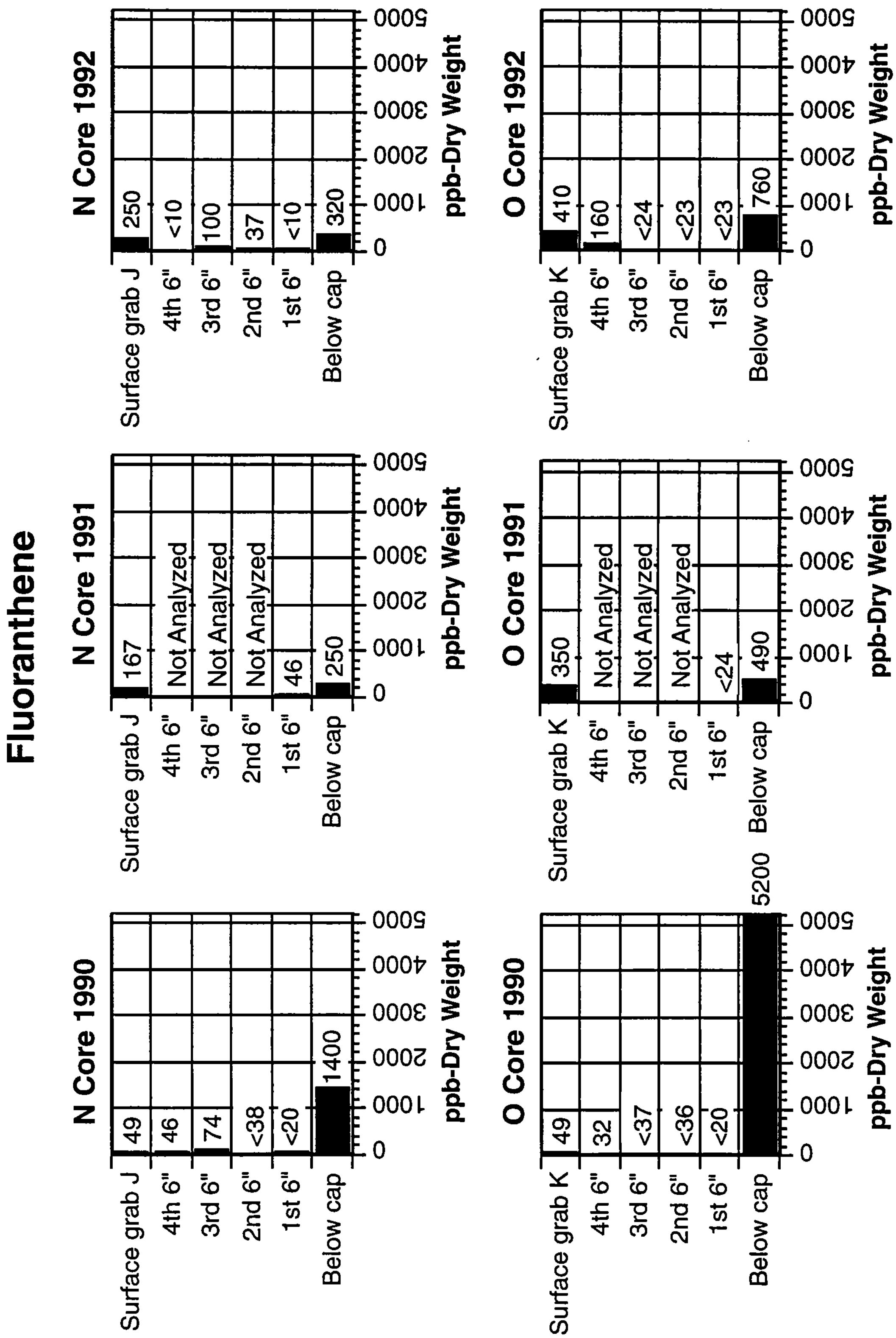


Figure 4-5. Floranthene

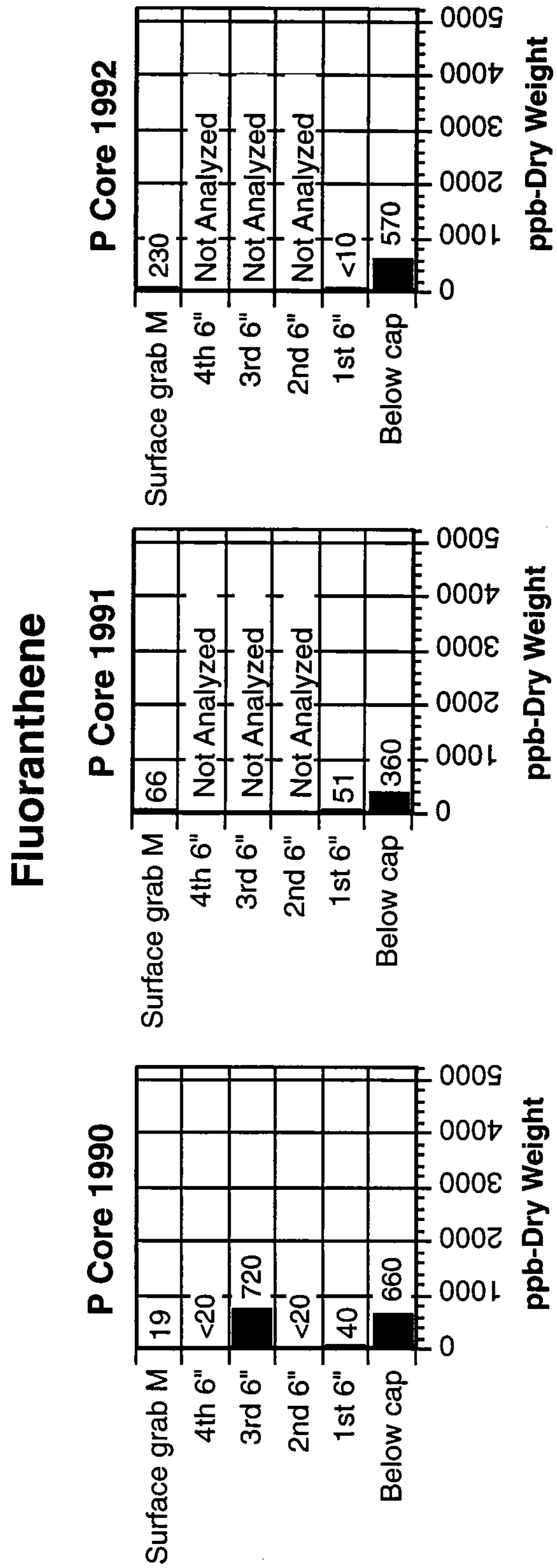


Figure 4-5. Floranthene *continued*

Figures and Tables

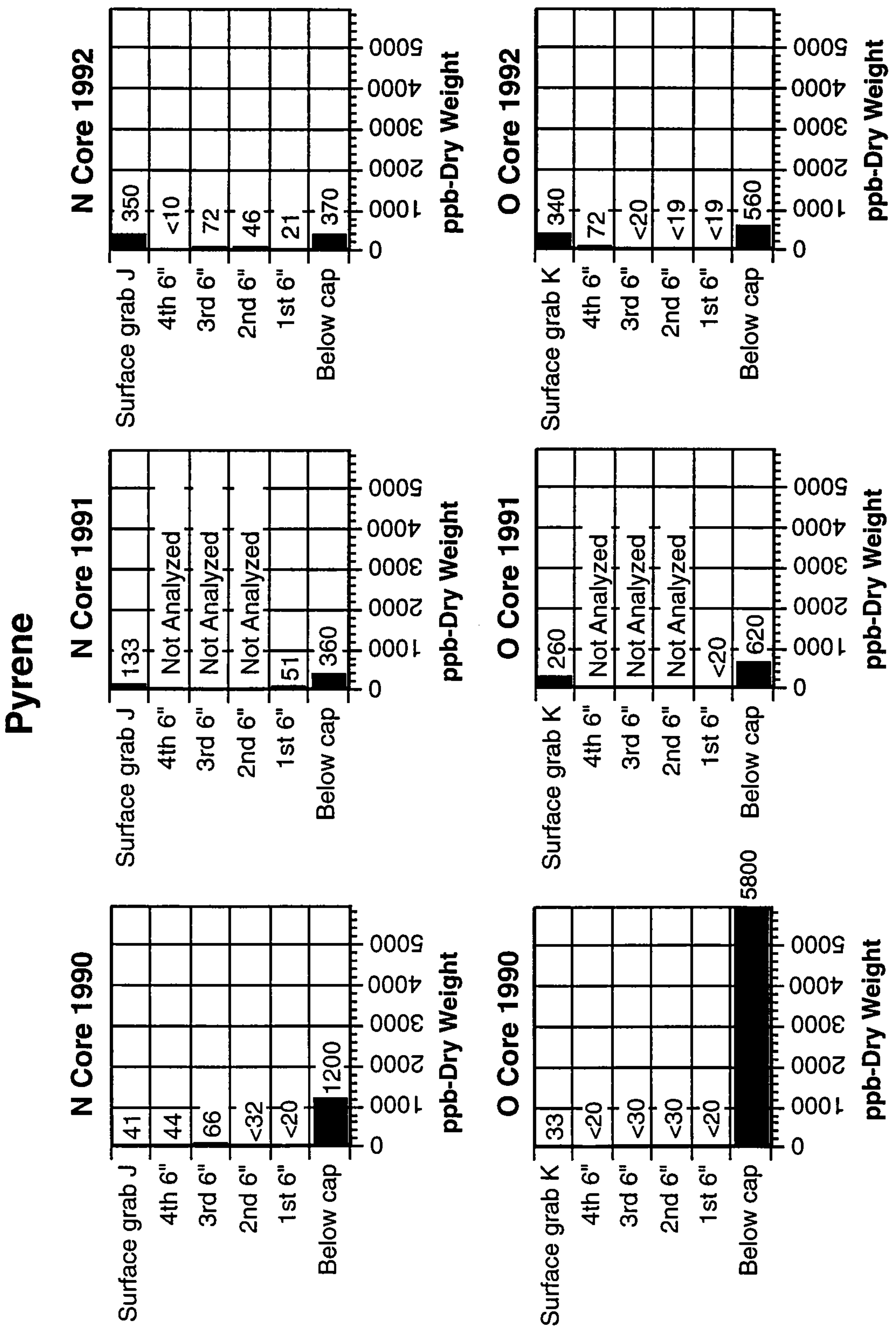


Figure 4-6. Pyrene

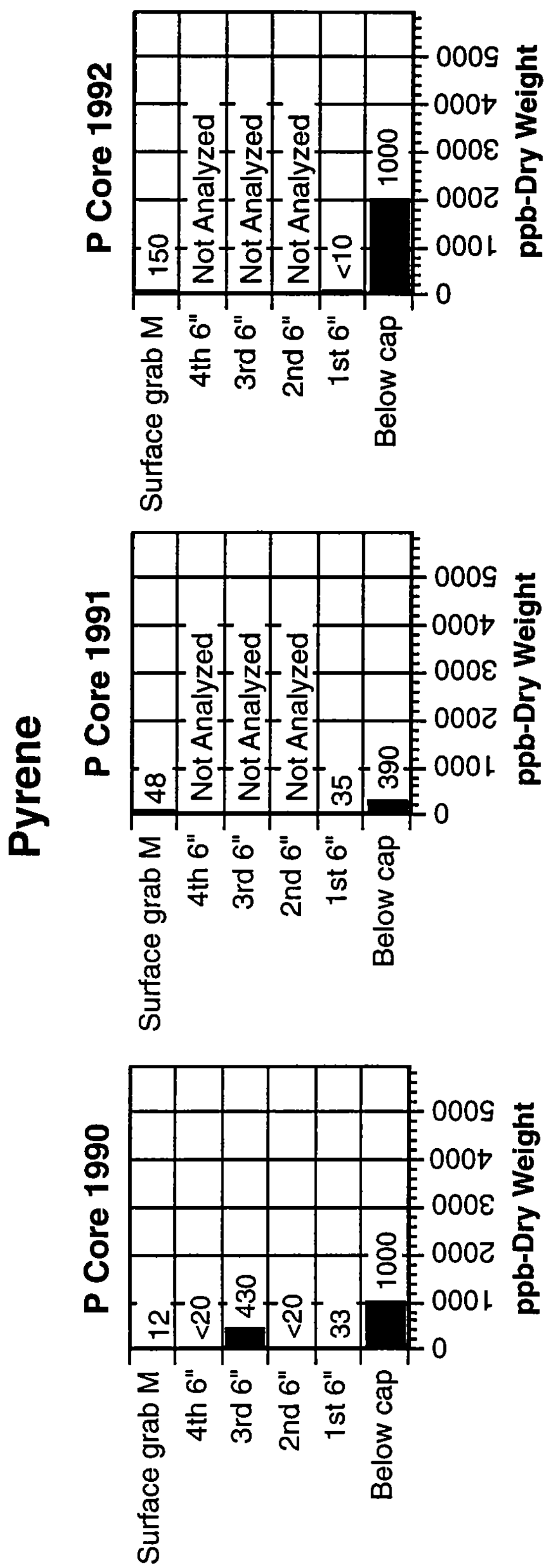


Figure 4-6. Pyrene *continued*

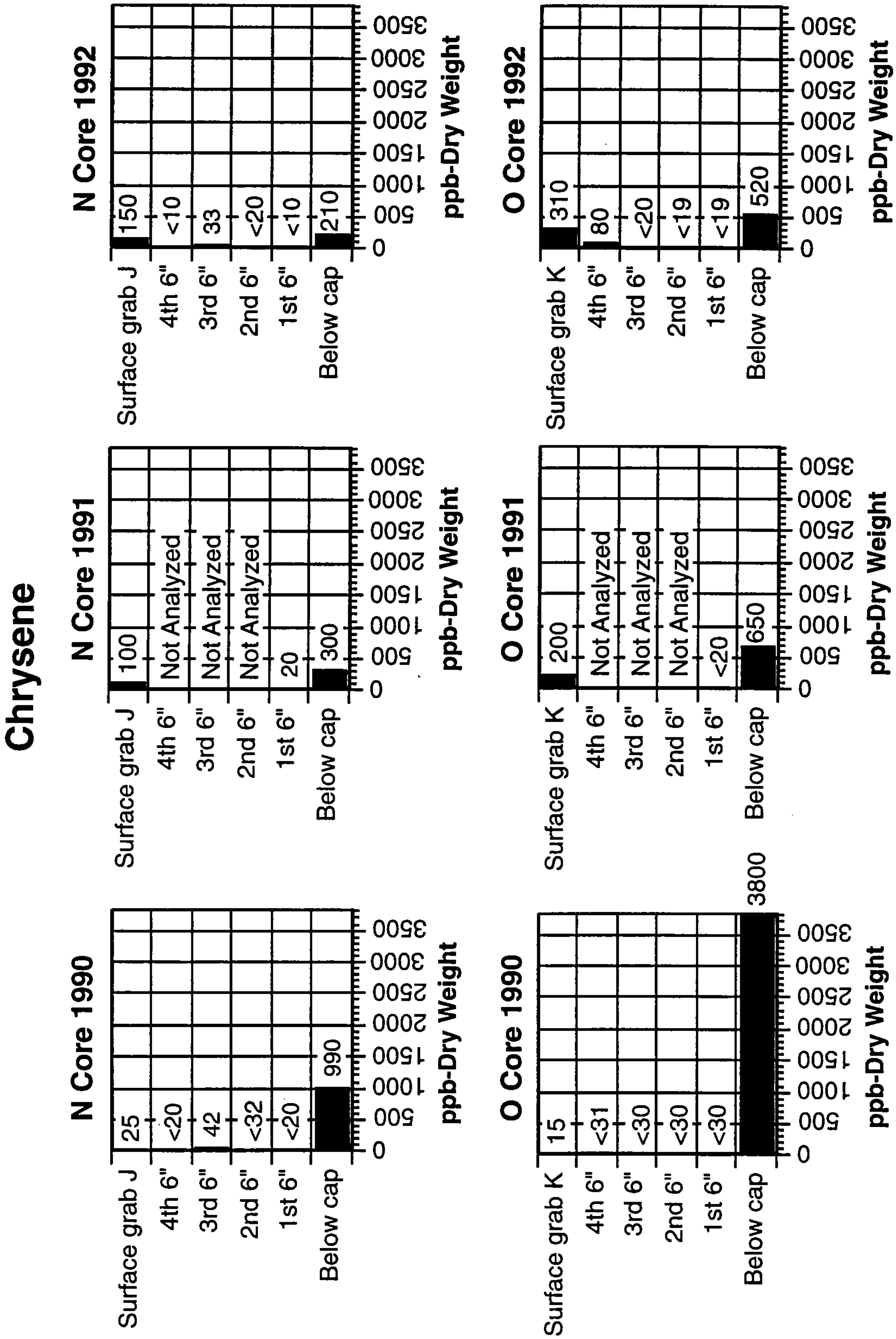


Figure 4-7. Chrysene

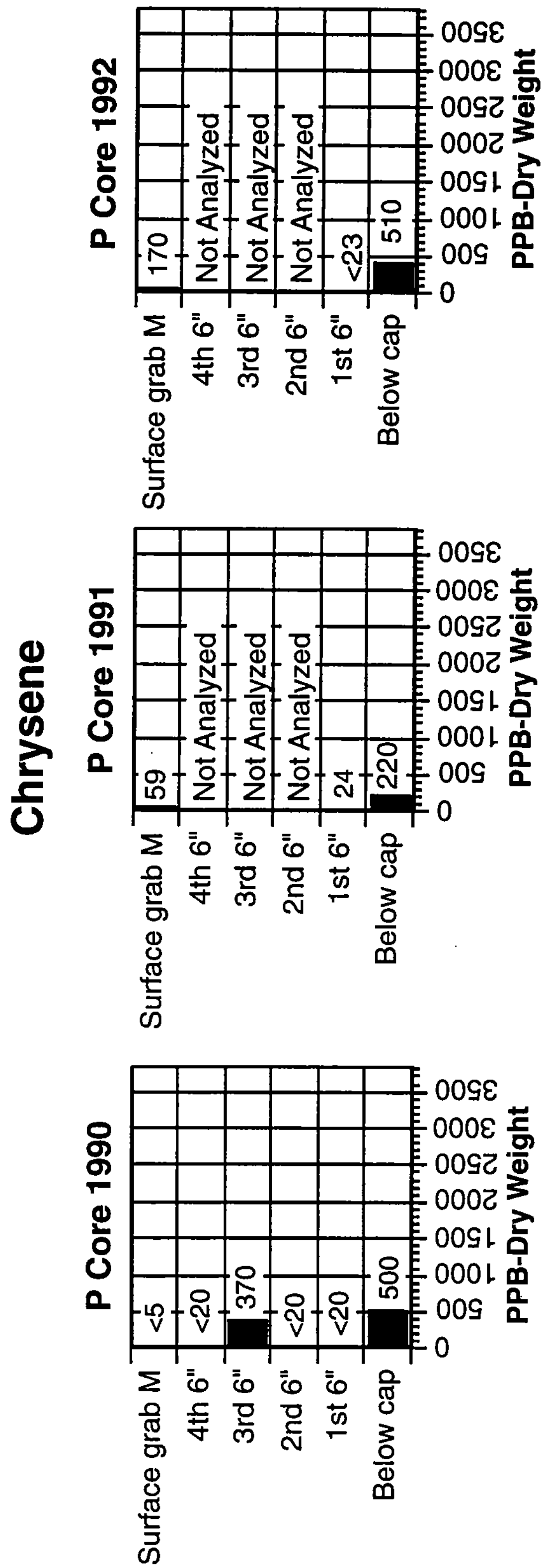


Figure 4-7. Chrysene *continued*

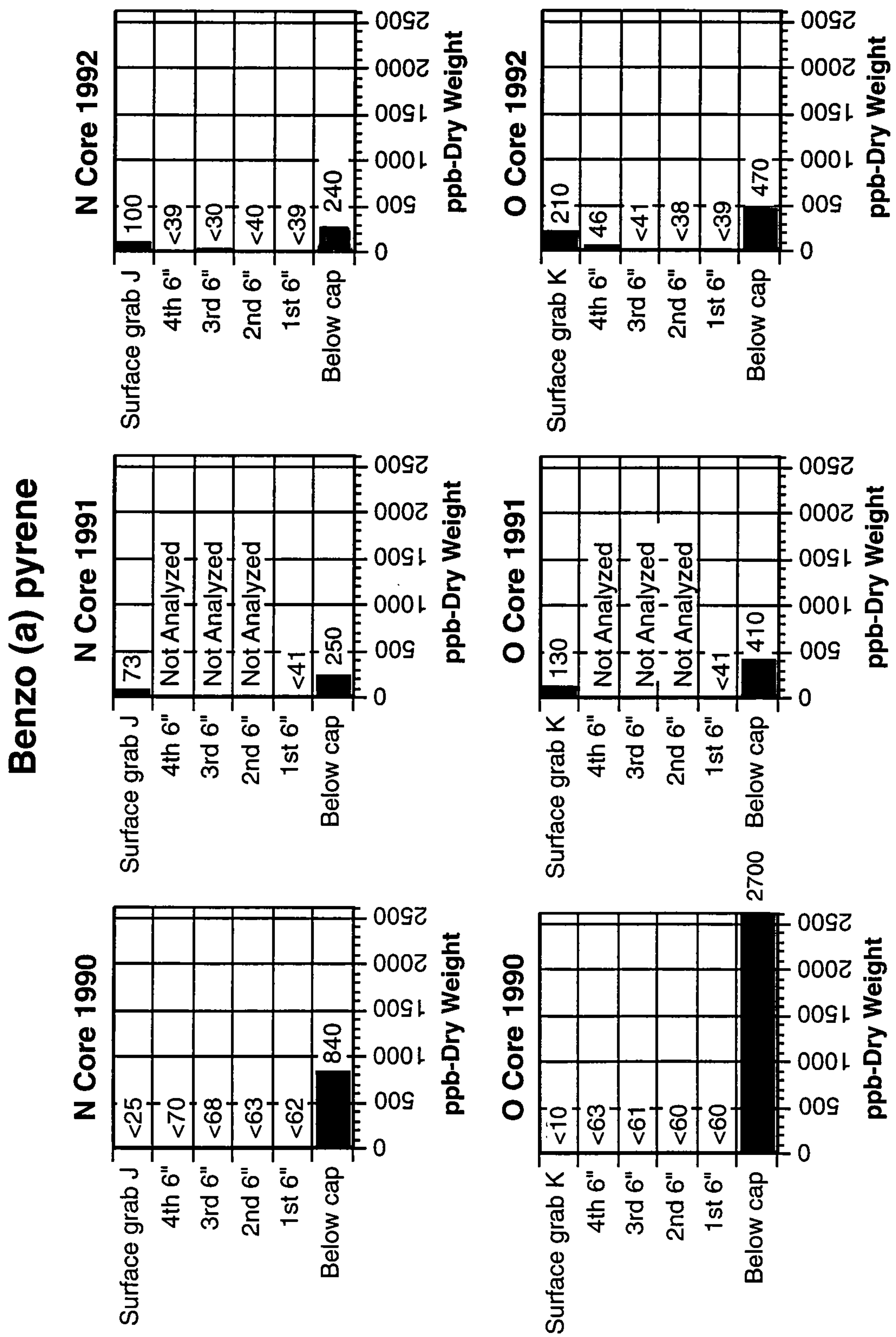


Figure 4-8. Benzo (a) pyrene

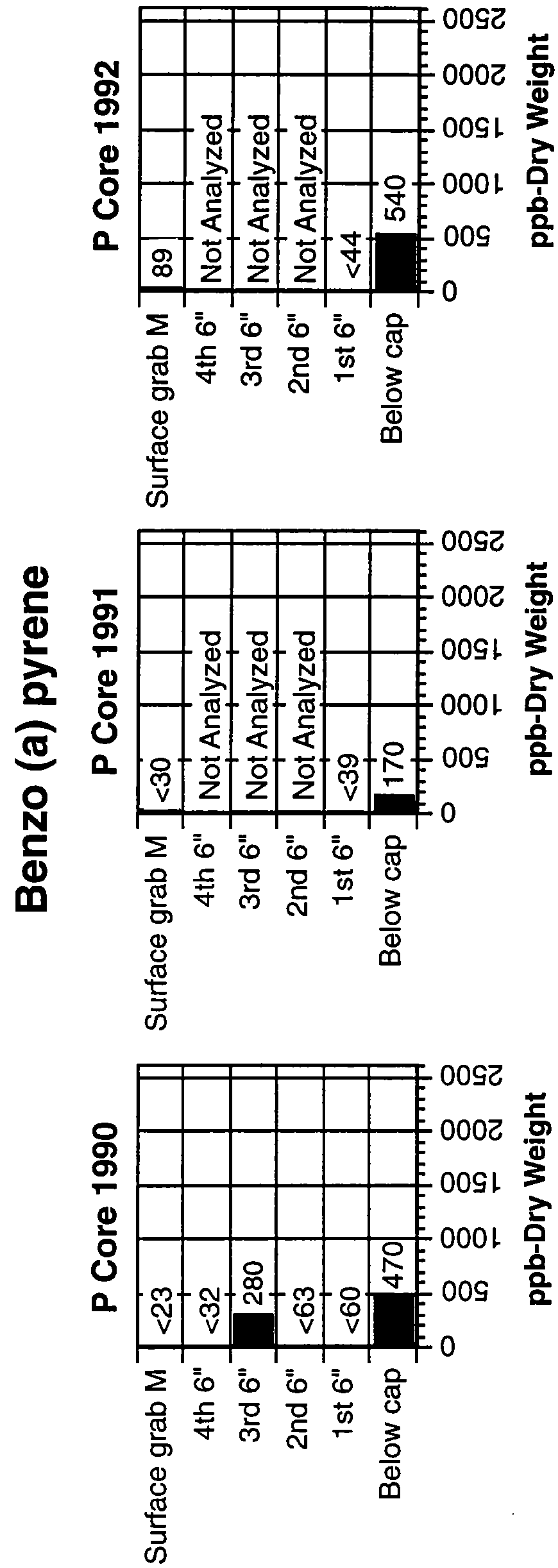


Figure 4-8. Benzo (a) pyrene *continued*

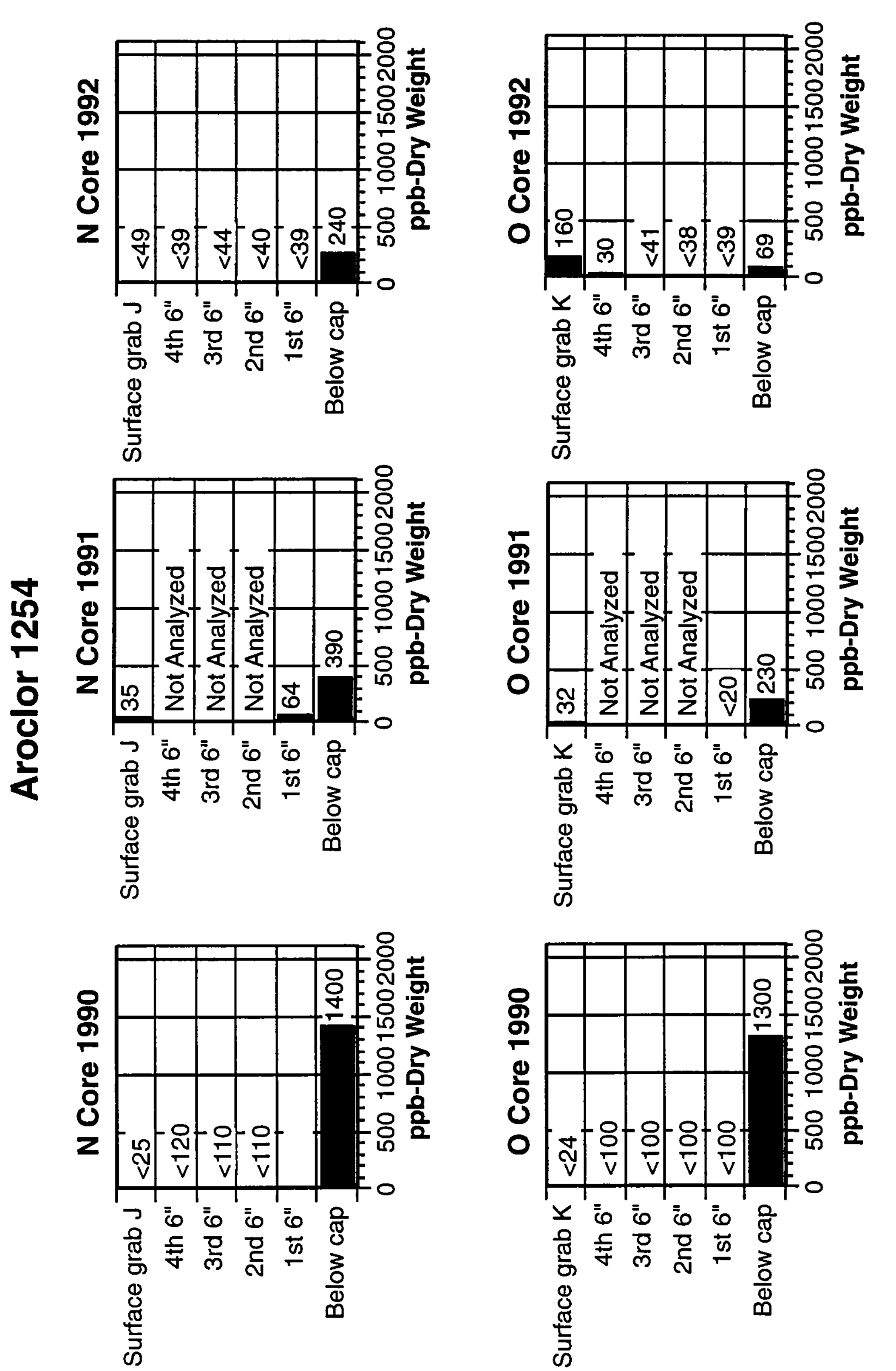


Figure 4-9. Aroclor 1254

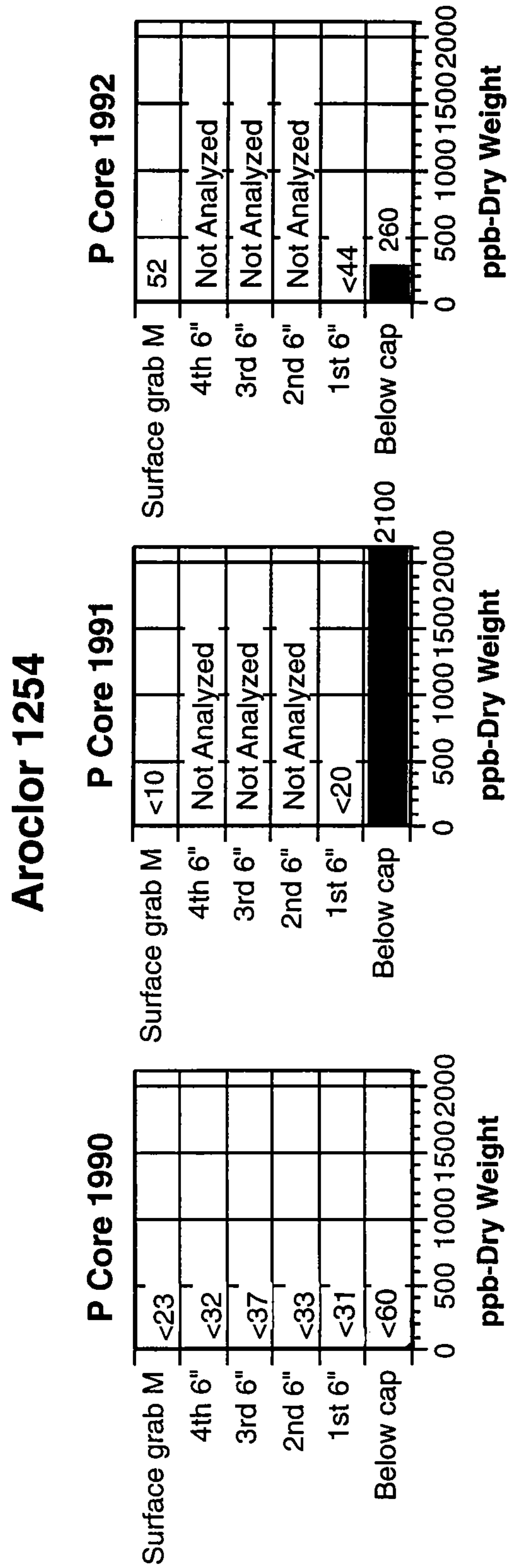


Figure 4-9. Aroclor 1254 *continued*

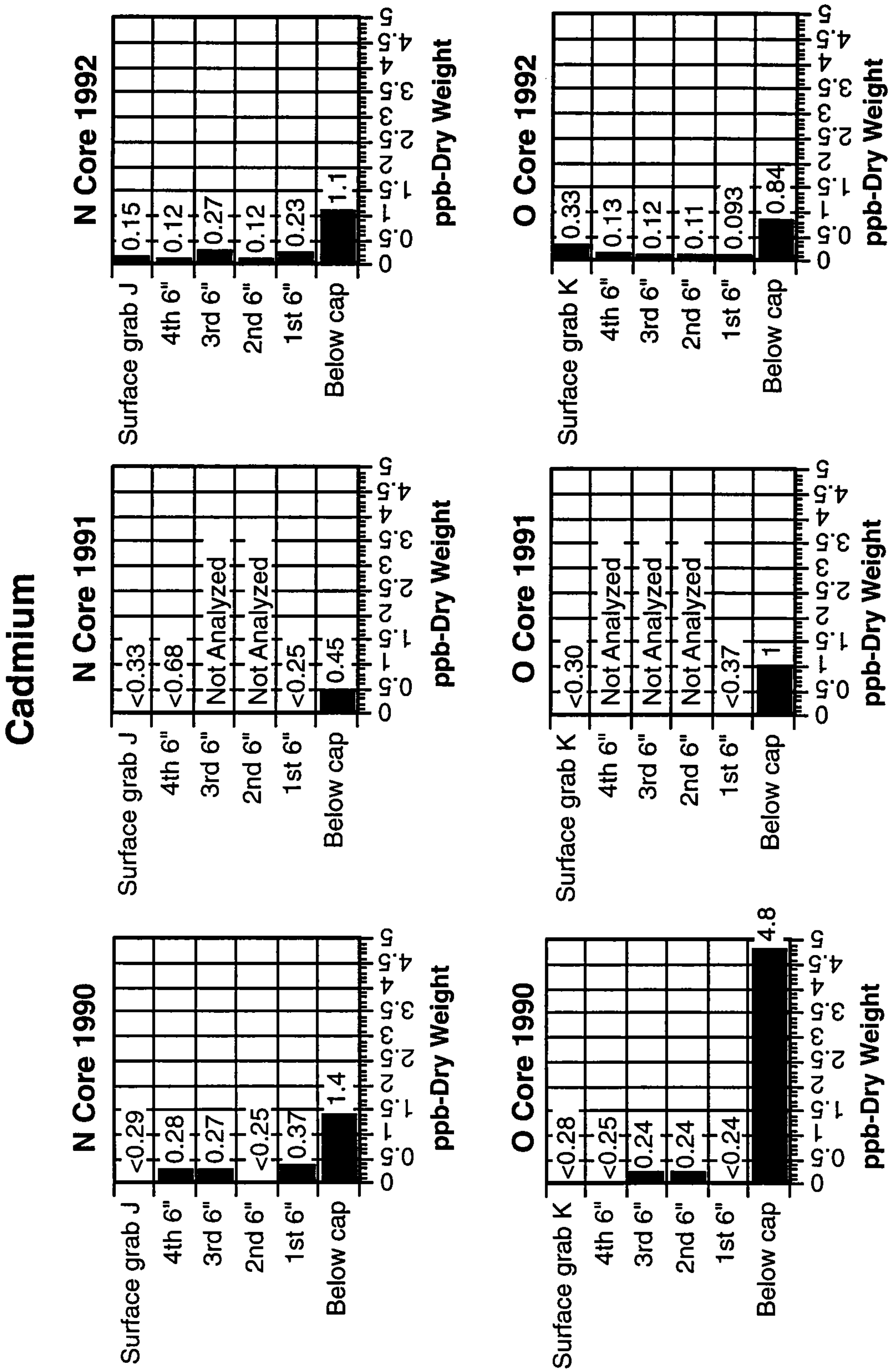


Figure 4-10. Cadmium

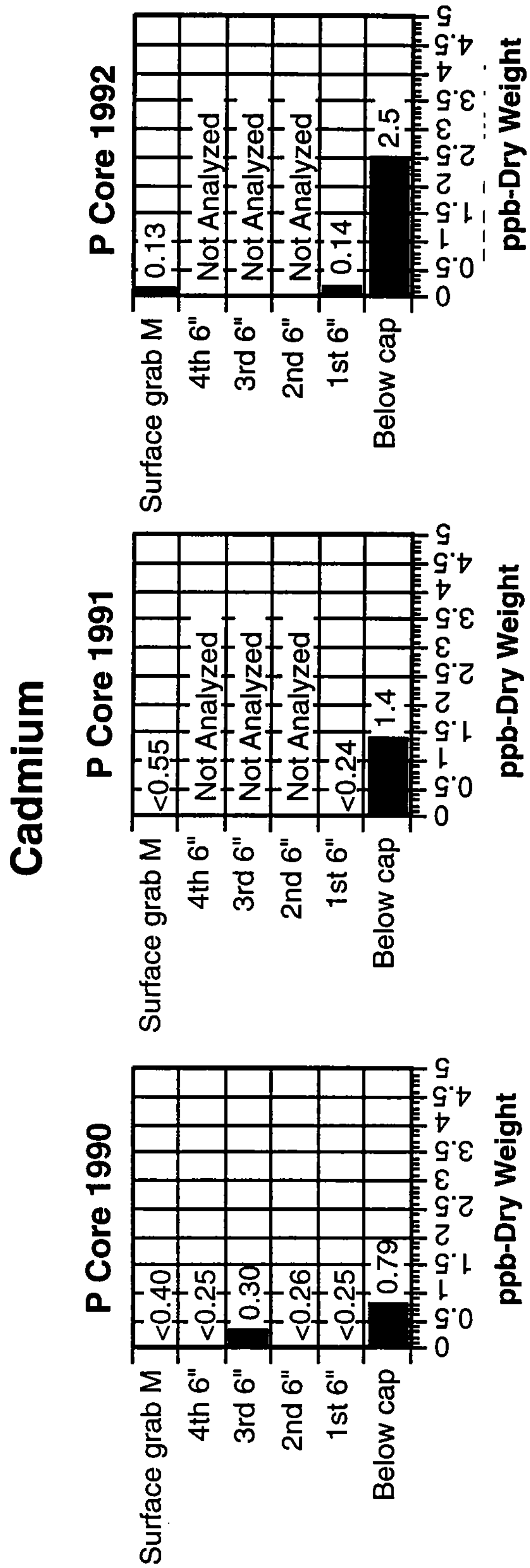


Figure 4-10. Cadmium *continued*

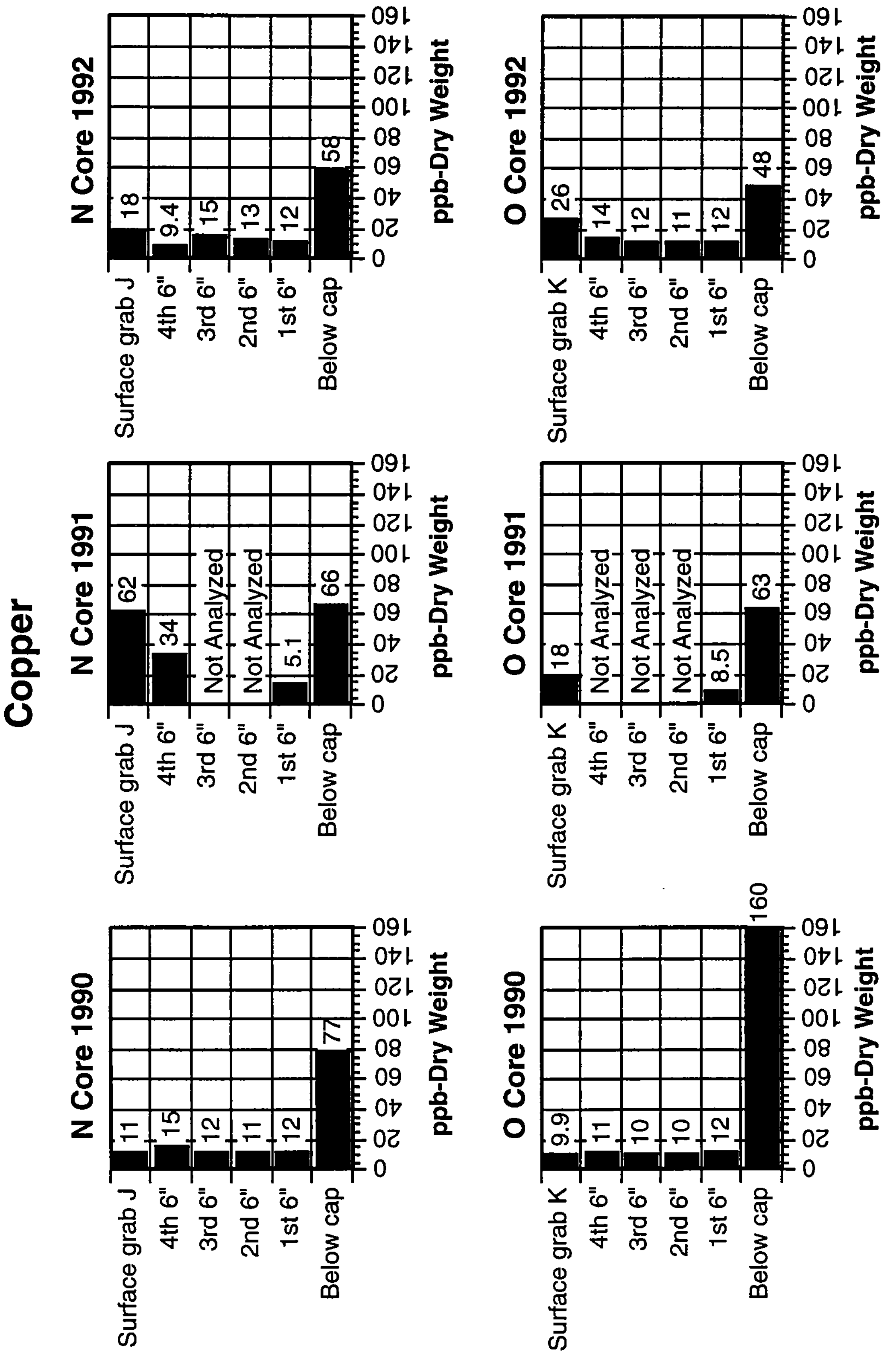


Figure 4-11. Copper

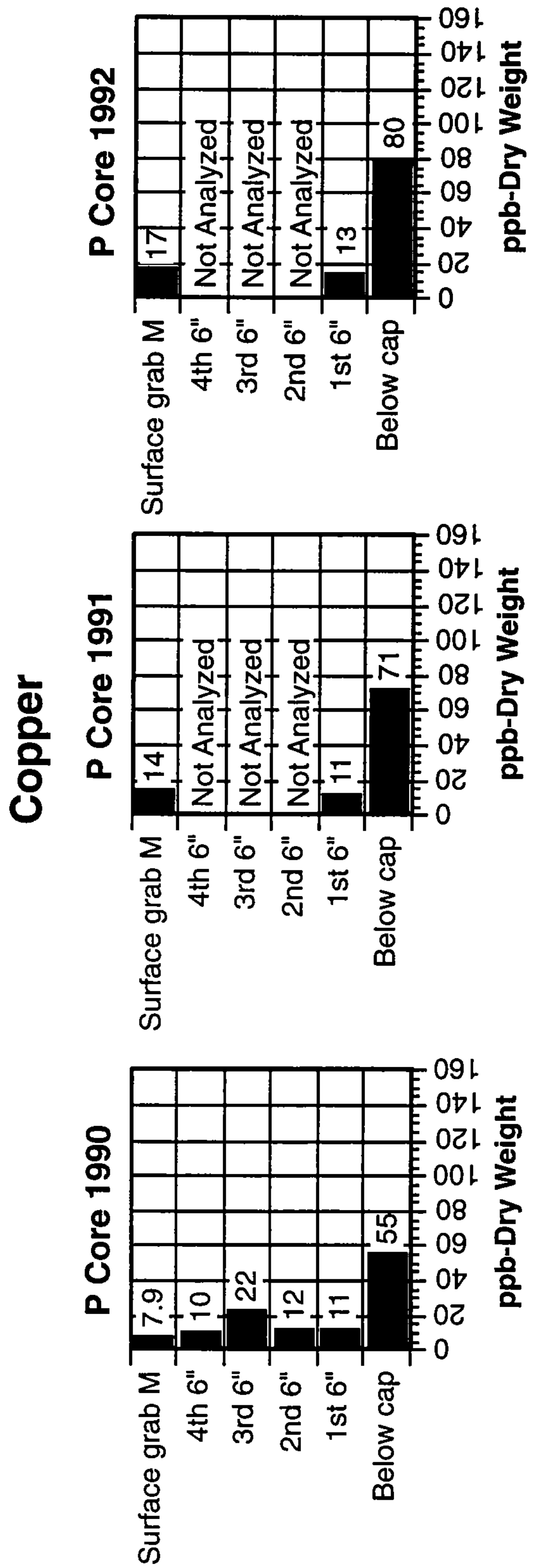


Figure 4-11. Copper *continued*

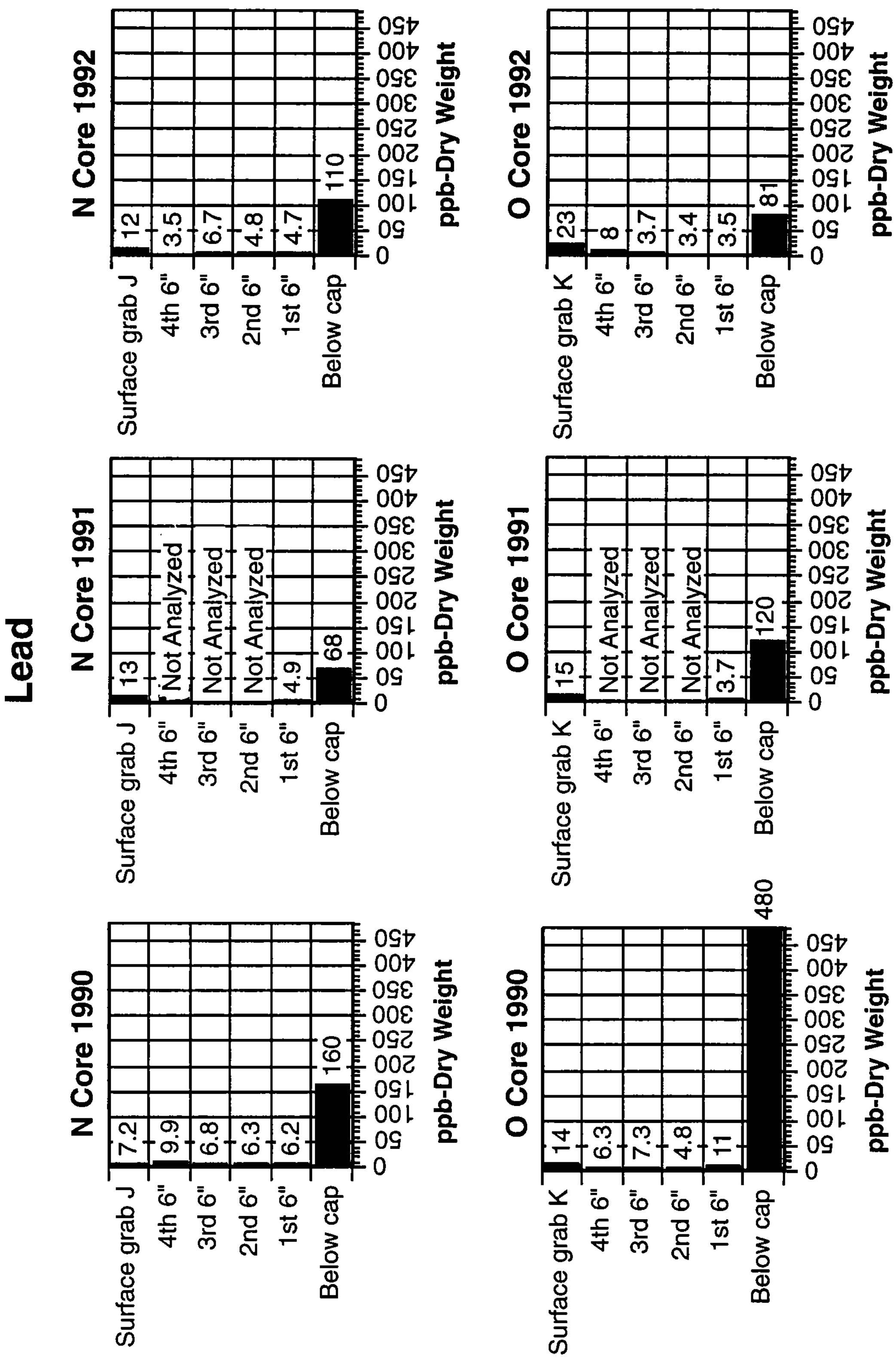


Figure 4-12. Lead

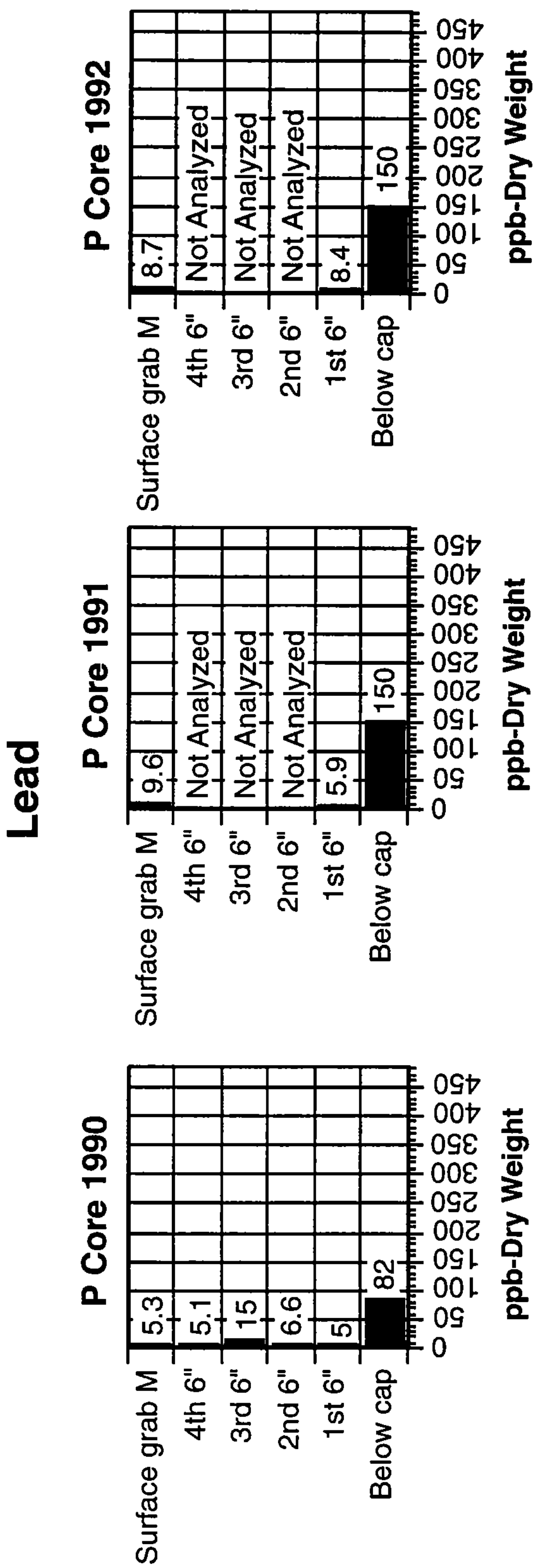


Figure 4-12. Lead *continued*

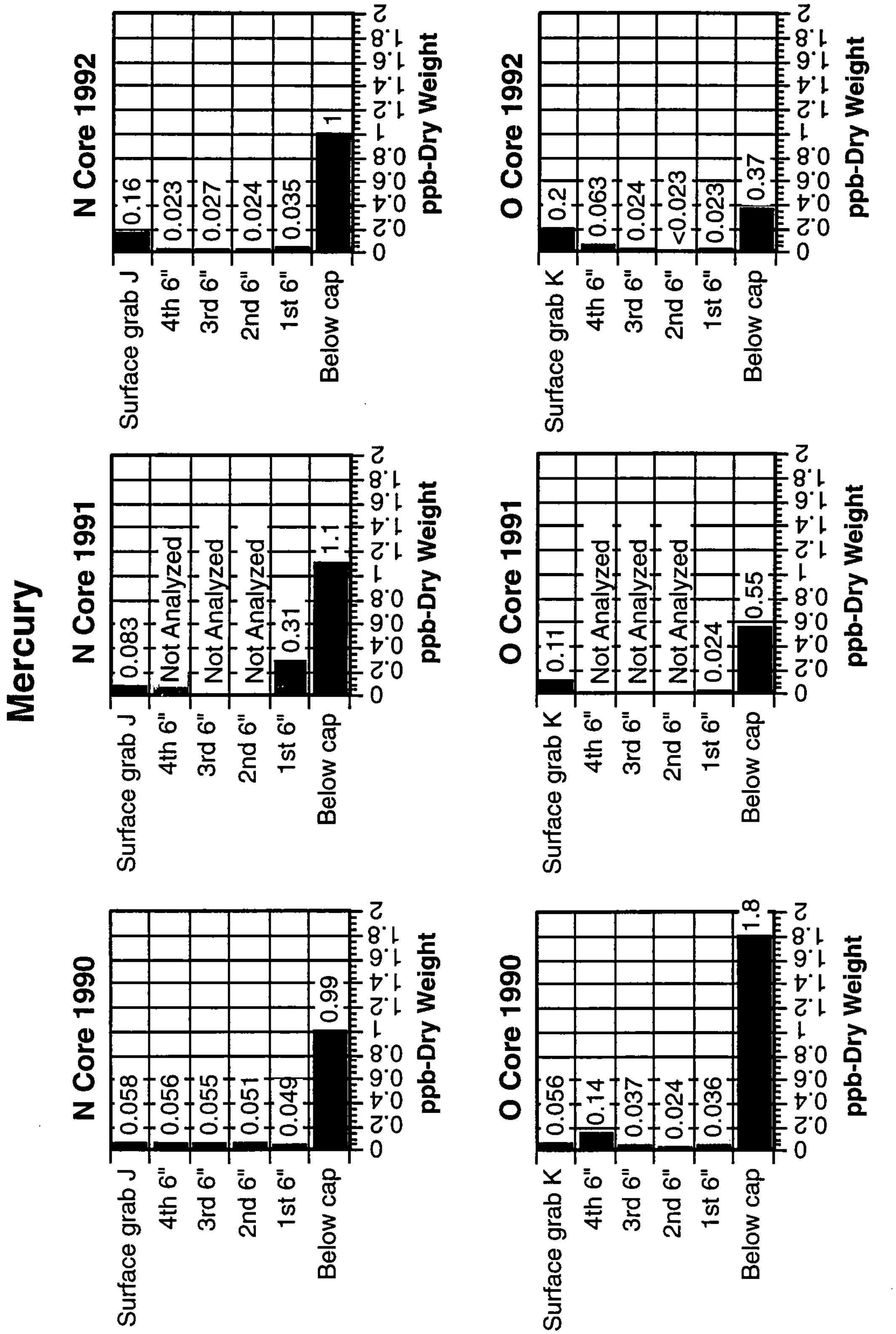


Figure 4-13. Mercury

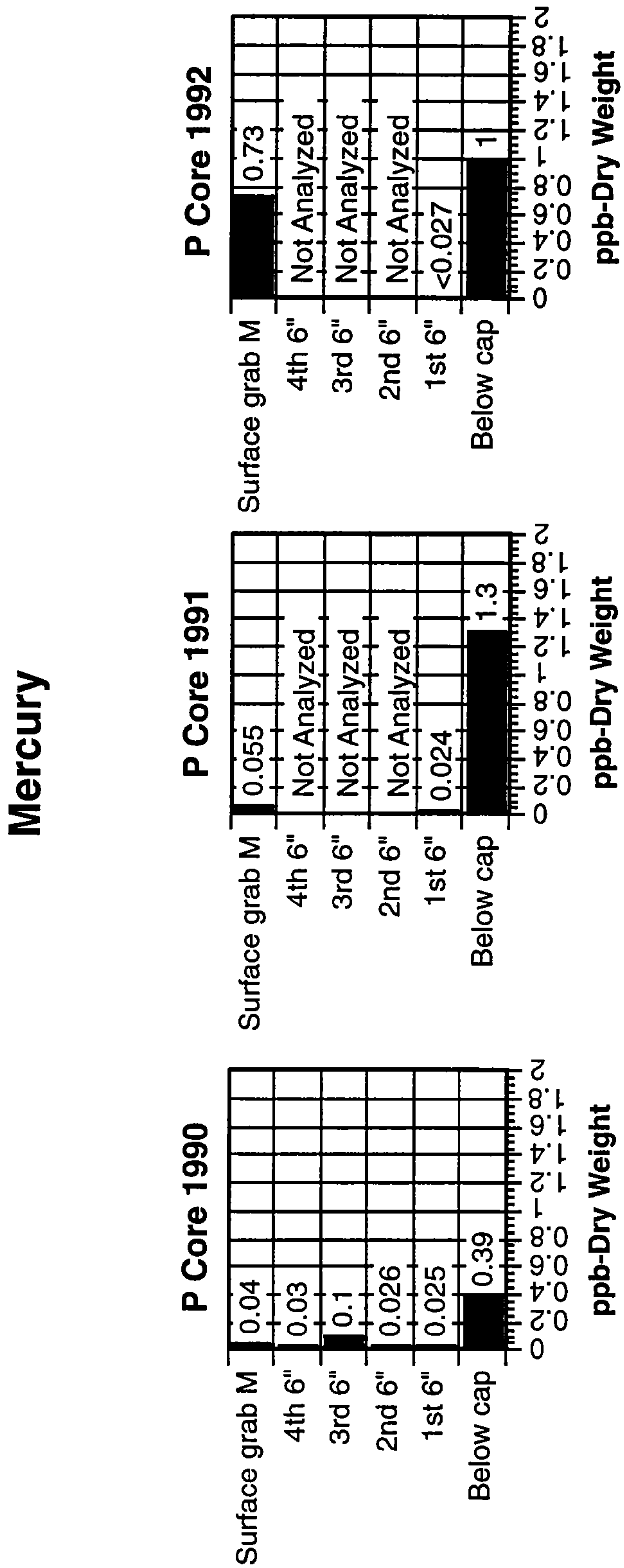


Figure 4-13. Mercury *continued*

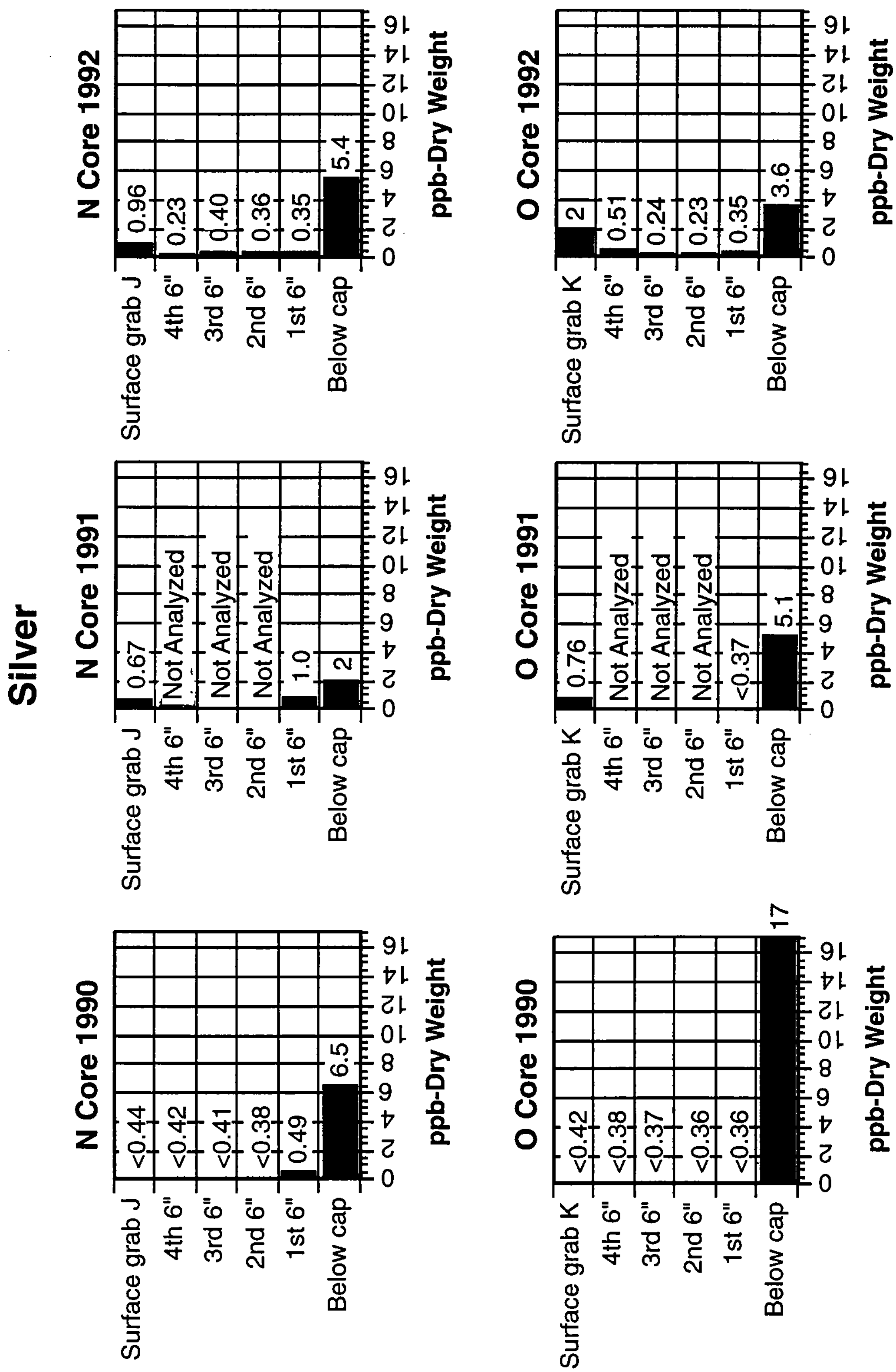


Figure 4-14. Silver

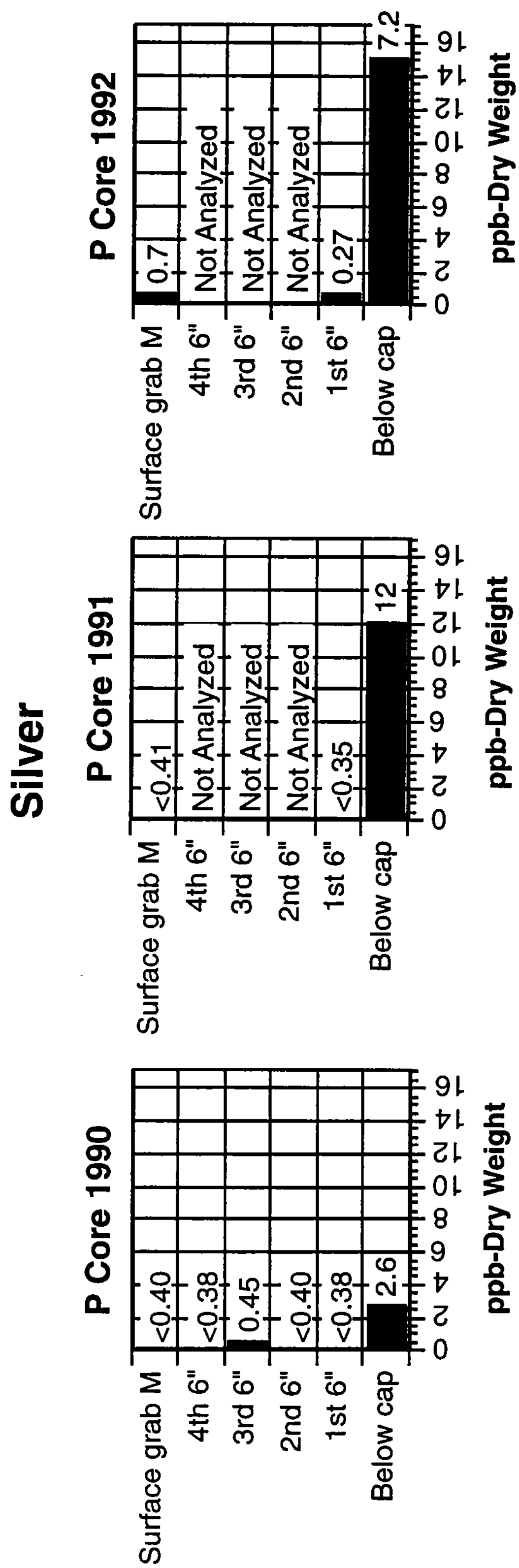


Figure 4-14. Silver *continued*

Figures and Tables

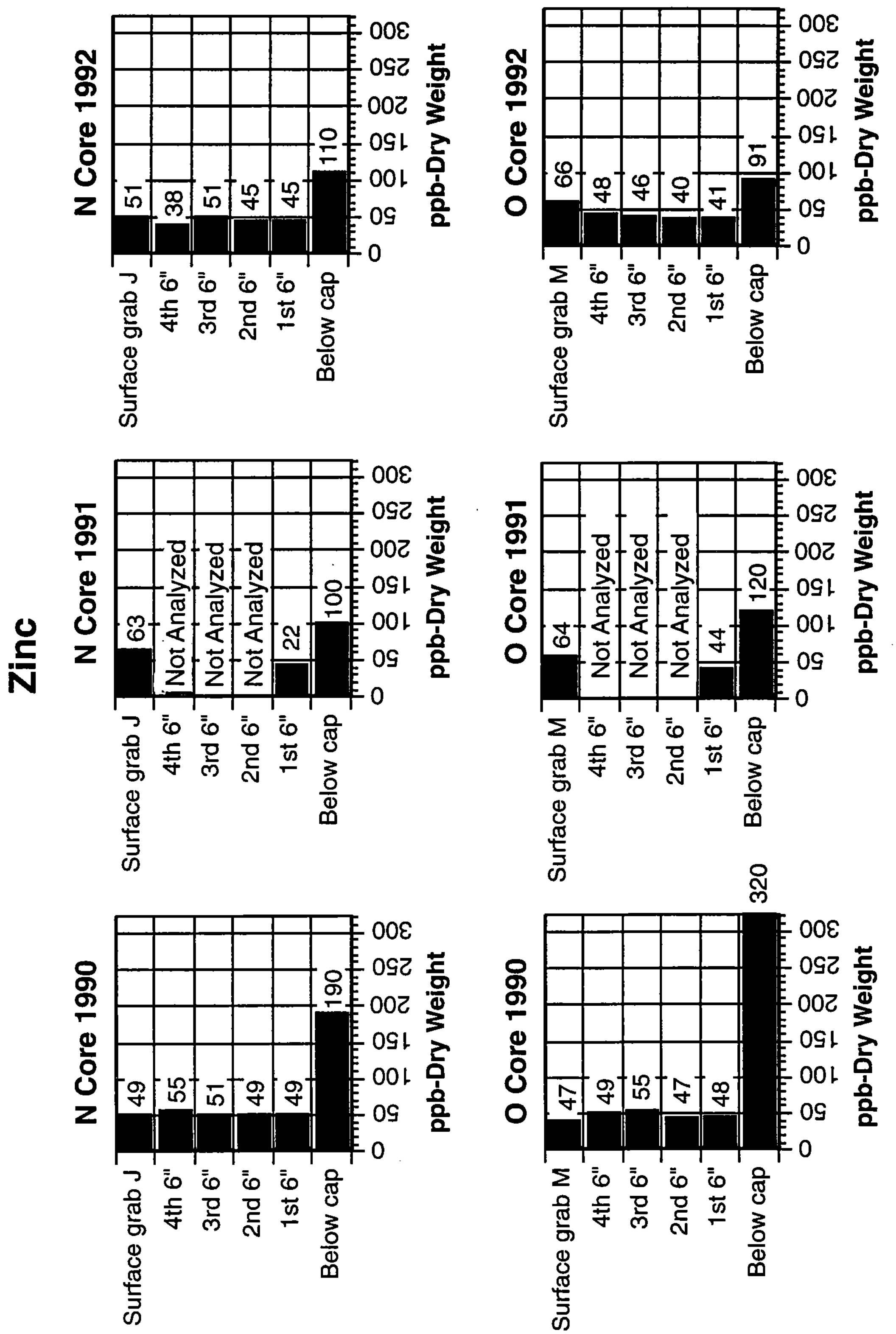


Figure 4-15. Zinc

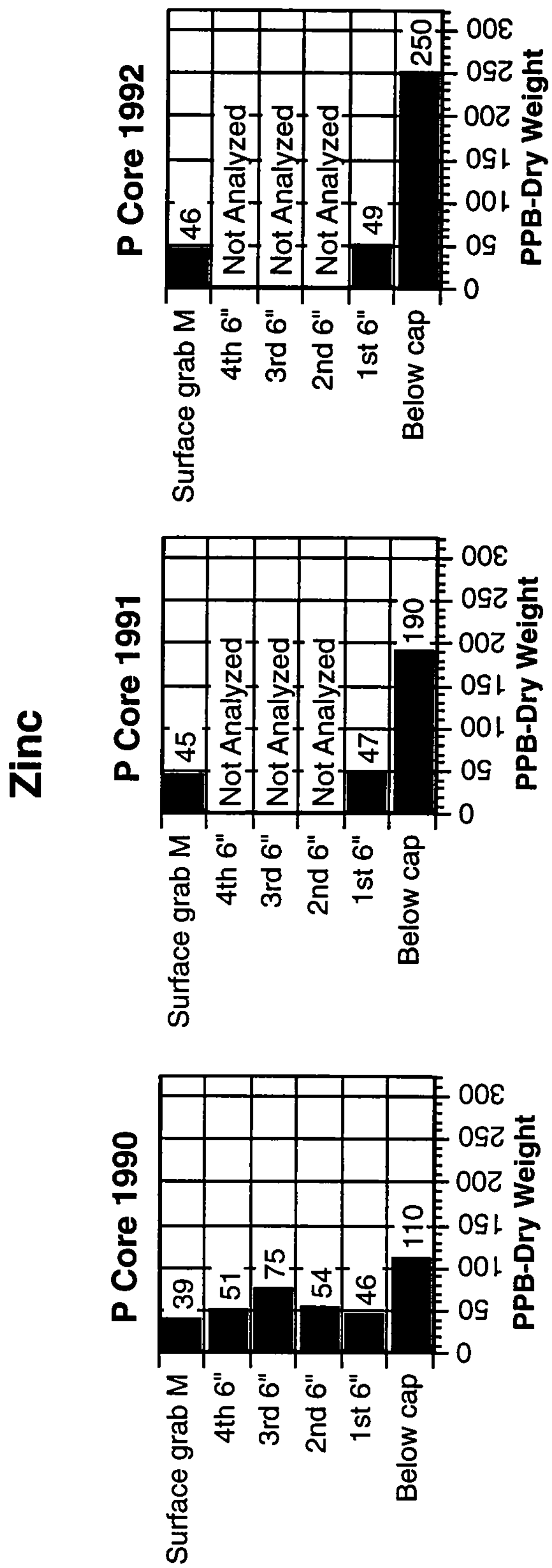


Figure 4-15. Zinc *continued*

TABLE 4-1. Core N: Organic Compounds and Metals, Below Cap

Sample Locator	1990 LTBD24				1991 LTBD24				1992 LTBD24				1992 Rep LTBD24			
Date Sampled	May 14, 90				May 30, 91				May 19, 92				May 19, 92			
Sample Number	9000432				9101228				9201197				9201202			
% Solids:	69				44				71				49			
% TOC	2.4				4.8				2.5				4.4			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs																
Naphthalene		<MDL	60	110		<MDL	70	110		<MDL	40	70		<MDL	60	100
Acenaphthylene	55		20	36		<MDL	20	39		<MDL	10	24	20	<RDL	20	35
Acenaphthene	110		10	29		<MDL	20	30		<MDL	10	18	33		10	27
Fluorene	110		20	36		<MDL	20	39	20		10	24	39		20	35
Phenanthrene	740		20	36	200		20	39	230		10	24	270		20	35
Anthracene	300		20	36	61		20	39	59		10	24	78		20	35
HPAHs																
Fluoranthene	1400		20	43	250		20	45	320		10	28	860		20	41
Pyrene	1200		20	36	360		20	39	370		10	24	490		20	35
Benzo(a)anthracene	590		20	36	180		20	39	170		10	24	200		20	35
Chrysene	990		20	36	300		20	39	210		10	24	190		20	35
Benzo(b)fluoranthene	1200		60	110	300		70	110	460		40	70	410		60	100
Benzo(k)fluoranthene	1000		60	110	270		70	110	130		40	70	290		60	100
Benzo(a)pyrene	840		40	72	250		50	75	240		30	46	350		40	67
Indeno(1,2,3-Cd)Pyrene	220		40	72	100		50	75	140		30	46	130		40	67
Dibenzo(a,h)anthracene		<MDL	60	110		<MDL	70	110	40	<RDL	40	70		<MDL	60	100
Benzo(g,h,i)perylene	160		40	72	80		50	75		<MDL	30	46	120		40	67
Other BNA																
Di-N-Butyl Phthalate		<MDL	40	72		<MDL,B	50	75		<MDL,B	30	46		<MDL,B	40	67
Benzyl Butyl Phthalate	280		20	36		<MDL	20	39	65		10	24		<MDL	20	35
Bis(2-Ethylhexyl)Phthalate	3600		20	36	590		20	39	1300		10	24	3100		20	35
Dibenzofuran		<MDL	40	72		<MDL	50	75		<MDL	30	46		<MDL	40	67
Benzoic Acid	350		100	220		<MDL	100	230		<MDL	70	140		<MDL	100	200
4-Methylphenol		<MDL	40	72		<MDL	50	75		<MDL	30	46		<MDL	40	67
Carbazole										<MDL	30	46	150		40	67
Coprostanol										<MDL	70	140		<MDL	100	200
PCBs (µg/kg dry weight)																
Aroclor 1248		<MDL	60	120		<MDL	100	190	340		20	46	590		30	67
Aroclor 1254	1400		60	120	390		100	190	240		20	46	200		30	67
Aroclor 1260		<MDL	60	120	320		100	190	480		20	46	410		30	67
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)		<MDL	40	72												
Acetone	280		40	72												
Metals (mg/kg dry weight)																
Mercury	0.99				1.1				1				0.55			
Aluminum	13000	B			15000				14000	B			20000	B		
Antimony	2.9	E				<MDL,G	7		2.8	E,G			2	E,G		
Arsenic	8.7	G			20				11				14			
Barium	78	B,E			61				80				94			
Beryllium	0.29				0.45				0.32				0.43			
Cadmium	1.4	L			0.45				1.1	L			1.3	L		
Chromium	45				48	E			41				55			
Copper	77				66	B			58	B			57	B		
Iron	19000				21000				18000	B			22000	B		
Lead	160				68				110	E,B			92	E,B		
Nickel	43				48				41				59			
Selenium	1.3					<MDL	10			<MDL	4			<MDL	2	
Silver	6.5				2				5.4				4.7			
Thallium		<MDL,E,G	3			<MDL	50		11				16			
Zinc	190	B			100	B			110	B			240	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-1 (continued). Core N: Organic Compounds and Metals, Section N1

Sample Locator	1990 LTBD24				1991 LTBD24				1992 LTBD24				1992 Rep LTBD24			
Date Sampled	May 14, 90				May 30, 91				May 19, 92				May 19, 92			
Sample Number	9000433				9101229				9201198				9201203			
% Solids:	81				81				86				83			
% TOC	1.4				0.81				1				1.5			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs																
Naphthalene		<MDL	50	92		<MDL	40	62		<MDL	30	58		<MDL	40	60
Acenaphthene		<MDL	10	25		<MDL	9	16		<MDL	8	15		<MDL	8	16
Acenaphthylene		<MDL	20	31		<MDL	10	21		<MDL	10	20		<MDL	10	20
Phenanthrene	43		20	31	31		10	21		<MDL	10	20		<MDL	10	20
Fluorene		<MDL	20	31		<MDL	10	21		<MDL	10	20		<MDL	10	20
Anthracene		<MDL	20	31		<MDL	10	21		<MDL	10	20		<MDL	10	20
HPAHs																
Fluoranthene		<MDL	20	37	46		10	25		<MDL	10	23		<MDL	10	24
Pyrene		<MDL	20	31	51		10	21	21		10	20	35		10	20
Benzo(a)anthracene		<MDL	20	31	20		10	21		<MDL	10	20		<MDL	10	20
Chrysene		<MDL	20	31	20		10	21		<MDL	10	20		<MDL	10	20
Benzo(b)fluoranthene		<MDL	50	92		<MDL	40	62		<MDL	30	58		<MDL	40	60
Benzo(k)fluoranthene		<MDL	50	92		<MDL	40	62		<MDL	30	58		<MDL	40	60
Benzo(a)pyrene		<MDL	30	62		<MDL	20	41		<MDL	20	38		<MDL	20	40
Indeno(1,2,3-Cd)Pyrene		<MDL	30	62		<MDL	20	41		<MDL	20	38		<MDL	20	40
Dibenzo(a,h)anthracene		<MDL	50	92		<MDL	40	62		<MDL	30	58		<MDL	40	60
Benzo(g,h,i)perylene		<MDL	30	62		<MDL	20	41		<MDL	20	38		<MDL	20	40
Other BNA																
Di-N-Butyl Phthalate		<MDL	30	62		<MDL,B	20	41		<MDL,B	20	38		<MDL,B	20	40
Benzyl Butyl Phthalate		<MDL	20	31		<MDL	10	21		<MDL	10	20		<MDL	10	20
Bis(2-Ethylhexyl)Phthalate		<MDL	20	31	270		10	21	33		10	20		<MDL	10	20
Dibenzofuran		<MDL	30	62		<MDL	20	41		<MDL	20	38		<MDL	20	40
Benzoic Acid	310		90	180		<MDL	60	120		<MDL	60	120		<MDL	60	120
4-Methylphenol		<MDL	30	62		<MDL	20	41		<MDL	20	38		<MDL	20	40
Carbazole										<MDL	20	38		<MDL	20	40
Coprostanol										<MDL	60	120		<MDL	60	120
PCBs (µg/kg dry weight)																
Aroclor 1254					54		10	21	20	<RDL	20	38		<MDL	20	40
Aroclor 1248					64		10	21		<MDL	20	38		<MDL	20	40
Aroclor 1260					40		10	21		<MDL	20	38		<MDL	20	40
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)																
Acetone																
Metals (mg/kg dry weight)																
Mercury	0.049				0.3				0.035					<MDL	0.02	
Aluminum	8600	B			3800				9400	B			9300	B		
Antimony		<MDL,E	0.9			<MDL,G	4		1.2	E,G			1.2	E,G		
Arsenic	6.2	G				<MDL	6		7				7.2			
Barium	31	B,E			14				36				35			
Beryllium	0.25				0.3				0.23				0.24			
Cadmium	0.37	L				<MDL	0.5		0.23	L			0.12	L		
Chromium	15				6.2	E			14				12			
Copper	12				5.1	B			12	B			11	B		
Iron	18000				8300				15000	B			14000	B		
Lead	6.2				4.9				4.7	E,B			8.1	E,B		
Nickel	12				4.9				12				11			
Selenium	0.62					<MDL	6			<MDL	3			<MDL	1	
Silver	0.49				1				0.35				0.36			
Thallium		<MDL,E,G	1			<MDL	20		9.3				11			
Zinc	49	B			22	B			45	B			46	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-2. Core N: Organic Compounds and Metals, Sections N2 and N3

Sample Locator	N2 1990 LTBD24				N2 1992 LTBD24				N3 1990 LTBD24				N3 1992 LTBD24			
Date Sampled	May 14, 90				May 19, 92				May 14, 90				May 19, 92			
Sample Number	9000434				9201199				9000435				9201200			
% Solids:	79				83				73				75			
% TOC	0.15				1.7				1.1				2.4			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs																
Naphthalene		<MDL	50	95		<MDL	40	60		<MDL	50	100		<MDL	40	67
Acenaphthene		<MDL	10	25		<MDL	8	16		<MDL	20	34		<MDL	9	17
Acenaphthylene		<MDL	20	32		<MDL	10	20		<MDL	10	27		<MDL	10	23
Phenanthrene		<MDL	20	32	22		10	20		<MDL	20	34	41		10	23
Fluorene		<MDL	20	32		<MDL	10	20	58		20	34		<MDL	10	23
Anthracene		<MDL	20	32		<MDL	10	20		<MDL	20	34	10	<RDL	10	23
HPAHs																
Fluoranthene		<MDL	20	38	37		10	24	74		20	41	100		10	27
Pyrene		<MDL	20	32	46		10	20	66		20	34	72		10	23
Benzo(a)anthracene		<MDL	20	32		<MDL	10	20		<MDL	20	34		<MDL	10	23
Chrysene		<MDL	20	32		<MDL	10	20	42		20	34	33		10	23
Benzo(b)fluoranthene		<MDL	50	95		<MDL	40	60		<MDL	50	100	40	<RDL	40	67
Benzo(k)fluoranthene		<MDL	50	95		<MDL	40	60		<MDL	50	100	40	<RDL	40	67
Benzo(a)pyrene		<MDL	30	63		<MDL	20	40		<MDL	30	68	30	<RDL	30	44
Indeno(1,2,3-Cd)Pyrene		<MDL	30	63		<MDL	20	40		<MDL	30	68		<MDL	30	44
Dibenzo(a,h)anthracene		<MDL	50	95		<MDL	40	60		<MDL	50	100		<MDL	40	67
Benzo(g,h,i)perylene		<MDL	30	63		<MDL	20	40		<MDL	30	68		<MDL	30	44
Other BNA																
Di-N-Butyl Phthalate		<MDL	30	63	20	<RDL,B	20	40		<MDL	30	68		<MDL,B	30	44
Benzyl Butyl Phthalate		<MDL	20	32		<MDL	10	20		<MDL	20	34		<MDL	10	23
Bis(2-Ethylhexyl)Phthalate		<MDL	20	32		<MDL	10	20		<MDL	20	34	68		10	23
Dibenzofuran		<MDL	30	63		<MDL	20	40		<MDL	30	68		<MDL	30	44
Benzoic Acid		<MDL	90	190		<MDL	60	120	270		100	210	130		70	130
4-Methylphenol		<MDL	30	63		<MDL	20	40	100		30	68		<MDL	30	44
Carbazole						<MDL	20	40						<MDL	30	44
Coprostanol						<MDL	60	120						<MDL	70	130
PCBs (µg/kg dry weight)																
Aroclor 1254		<MDL	60	110		<MDL	20	40		<MDL	50	110		<MDL	20	44
Aroclor 1248		<MDL	60	110		<MDL	20	40		<MDL	50	110		<MDL	20	44
Aroclor 1260		<MDL	60	110		<MDL	20	40		<MDL	50	110		<MDL	20	44
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)																
Acetone																
Metals (mg/kg dry weight)																
Mercury	0.051				0.02				0.06				0.027			
Aluminum	8700	B			9300	B			9300	B			11000	B		
Antimony		<MDL,E	1		1.2	E,G				<MDL,E	1		1.3	E,G		
Arsenic	5.1	G			8.4				5.5	G			9.3			
Barium	33	B,E			42				40	B,E			44			
Beryllium	0.25				0.28				0.14				0.31			
Cadmium		<MDL,L	0		0.12	L			0.27	L			0.27	L		
Chromium	14				12				13				15			
Copper	11				13	B			12				15	B		
Iron	18000				16000	B			18000				17000	B		
Lead	6.3				4.8	E,B			6.8				6.7	E,B		
Nickel	12				11				12				13			
Selenium	0.76					<MDL	2		0.96					<MDL	3	
Silver		<MDL	0		0.36					<MDL	0		0.4			
Thallium		<MDL,E,G	1		9.6					<MDL E,G	1		9.3			
Zinc	49	B			45	B			51	B			51	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-2 (continued). Station N: Organics and Metals, Section N4

Sample Locator	N4		LTBD24		N4		LTBC34	
Date Sampled	May 14, 90				May 19, 92			
Sample Number	9000436				9201201			
% Solids:	71				86			
% TOC	2.5				0.4			
BNA Organics (µg/kg dry weight)	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**
LPAHs								
Naphthalene		<MDL	50	110		<MDL	30	58
Acenaphthene		<MDL	10	28		<MDL	10	20
Acenaphthylene		<MDL	20	35		<MDL	8	15
Phenanthrene		<MDL	20	35		<MDL	10	20
Fluorene		<MDL	20	35		<MDL	10	20
Anthracene		<MDL	20	35		<MDL	10	20
HPAHs								
Fluoranthene	46		20	42		<MDL	10	23
Pyrene	44		20	35		<MDL	10	20
Benzo(a)anthracene		<MDL	20	35		<MDL	10	20
Chrysene		<MDL	20	35		<MDL	10	20
Benzo(b)fluoranthene		<MDL	50	110		<MDL	30	58
Benzo(k)fluoranthene		<MDL	50	110		<MDL	30	58
Benzo(a)pyrene		<MDL	40	70		<MDL	20	38
Indeno(1,2,3-Cd)Pyrene		<MDL	40	70		<MDL	20	38
Dibenzo(a,h)anthracene		<MDL	50	110		<MDL	30	58
Benzo(g,h,i)perylene		<MDL	40	70		<MDL	20	38
Other								
Di-N-Butyl Phthalate		<MDL	40	70		<MDL,B	20	38
Benzyl Butyl Phthalate		<MDL	20	35		<MDL	10	20
Bis(2-Ethylhexyl)Phthalate		<MDL	20	35		<MDL	10	20
Dibenzofuran		<MDL	40	70		<MDL	20	38
Benzoic Acid	280		100	210		<MDL	60	120
4-Methylphenol		<MDL	40	70		<MDL	20	38
Carbazole						<MDL	20	38
Coprostanol						<MDL	60	120
PCBs (µg/kg dry weight)								
Aroclor 1254		<MDL	60	120		<MDL	20	38
Aroclor 1248		<MDL	60	120		<MDL	20	38
Aroclor 1260		<MDL	60	120		<MDL	20	38
Volatiles (µg/kg dry weight)								
2-Butanone (MEK)								
Acetone								
Metals (mg/kg dry weight)								
Mercury	0.056				0.023			
Aluminum	11000	B			8000	B		
Antimony		<MDL,E	0.8		1.2	E,G		
Arsenic	5.6	G			7			
Barium	59	B,E			27			
Beryllium	0.28				0.23			
Cadmium	0.28	L			0.12	L		
Chromium	14				11			
Copper	15				9.4	B		
Iron	20000				14000	B		
Lead	9.9				3.5	E,B		
Nickel	17				10			
Selenium	0.85					<MDL	1	
Silver		<MDL	0.4		0.23			
Thallium		<MDL,E,G	0.8		9.3			
Zinc	55	B			38	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-3. Core O: Organic Compounds and Metals, Below Cap

Sample Locator	1990 LTBC35				1991 LTBC35				1992 LTBC35				Replicate 1992			
Date Sampled	May 14, 90				May 30, 91				May 19, 92				May 19, 92			
Sample Number	9000427				9101233				9201189				9201194			
% Solids:	60				78				75				75			
% TOC	2.8				1				3.3				3.6			
BNA Organics (µg/kg dry)	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**
LPAHs																
Naphthalene		<MDL	100	250		<MDL	40	64		<MDL	40	67		<MDL	40	67
Acenaphthene	150		30	67	49		9	17	31		9	17	39		9	17
Acenaphthylene	140		40	83	27		10	22	27		10	23	25		10	23
Phenanthrene	1800		40	83	470		10	22	440		10	23	410		10	23
Fluorene	230		40	83	45		10	22	37		10	23	47		10	23
Anthracene	1200		40	83	120		10	22	240		10	23	190		10	23
HPAHs																
Fluoranthene	5200		50	100	490		10	26	760		10	27		<MDL	10	27
Pyrene	5800		40	83	620		10	22	560		10	23	570		10	23
Benzo(a)anthracene	2800		40	83	450		10	22	390		10	23	350		10	23
Chrysene	3800		40	83	650		10	22	520		10	23	470		10	23
Benzo(b)fluoranthene	3500		100	250	590		40	64	760		40	67	760		40	67
Benzo(k)fluoranthene	3400		100	250	420		40	64	670		40	67	320		40	67
Benzo(a)pyrene	2700		80	170	410		30	42	470		30	44	390		30	44
Indeno(1,2,3-Cd)Pyrene	700		80	170	140		30	42		<MDL	30	44	170		30	44
Dibenzo(a,h)anthracene		<MDL	100	250		<MDL	40	64		<MDL	40	67	50	<RDL	40	67
Benzo(g,h,i)perylene	530		80	170	140		30	42		<MDL	30	44	190		30	44
Other BNA																
Di-N-Butyl Phthalate		<MDL	80	170		<MDL,B	30	42		<MDL,B	30	44		<MDL,B	30	44
Benzyl Butyl Phthalate	850		40	83	280		10	22	97		10	23	110		10	23
Bis(2-Ethylhexyl)Phthalat	11000		40	83	1500		10	22	1300		10	23	1500		10	23
Dibenzofuran		<MDL	80	170		<MDL	30	42		<MDL	30	44		<MDL	30	44
Benzoic Acid	1100		300	500		<MDL	60	130		<MDL	70	130		<MDL	70	130
4-Methylphenol		<MDL	80	170		<MDL	30	42		<MDL	30	44		<MDL	30	44
Carbazole									150		30	44	100		30	44
Coprostanol										<MDL	70	130		<MDL	70	130
PCBs (µg/kg dry weight)																
Aroclor 1254	1300		7	14	230		50	110	69		20	44	120		20	44
Aroclor 1248		<MDL	7	14	140		50	110	150		20	44	150		20	44
Aroclor 1260		<MDL	7	14	120		50	110	110		20	44	79		20	44
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)	150		50	83												
Acetone	420		50	83												
Metals (mg/kg dry weight)																
Mercury	1.8				0.55				0.37				0.33			
Aluminum	12000	B			11000				12000	B			12000	B		
Antimony	6.7	E				<MDL,G	4		2.7	E,G			2.7	E,G		
Arsenic	13	G			13				12				12			
Barium	97	B,E			58				52				67			
Beryllium	0.15				0.26				0.31				0.33			
Cadmium	4.8	L			1				0.84	L			1.1	L		
Chromium	55				46	E			32				37			
Copper	160				63	B			48	B			79	B		
Iron	18000				15000				16000	B			15000	B		
Lead	480				120				81	E,B			120	E,B		
Nickel	42				38				31				33			
Selenium	1.3					<MDL	6			<MDL	4			<MDL	1	
Silver	17				5.1				3.6				5.1			
Thallium		<MDL,E,G	2			<MDL	30		11				9.3			
Zinc	320	B			120	B			91	B			120	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits

<MDL - Undetected at the method detection limit

B - Blank contamination

G - Low standard reference material recovery

L - High standard reference material recovery

E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-3 (continued). Core O: Organic Compounds and Metals, Section O1

Sample Locator	1990 LTBC35				1991 LTBC35				1992 LTBC35				1992 Replicate			
Date Sampled	May 14, 90				May 30, 91				May 19, 92				May 19, 92			
Sample Number	9000428				9101234				9201190				9201195			
% Solids:	83				82				86				84			
% TOC	0.1				0.08				1.4				1.3			
BNA Organics (µg/kg dry)	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**
LPAHs																
Naphthalene		<MDL	50	90		<MDL	40	61		<MDL	30	58		<MDL	40	60
Acenaphthene		<MDL	20	30		<MDL	9	16		<MDL	8	15	61		8	15
Acenaphthylene		<MDL	10	24		<MDL	10	21		<MDL	10	20		<MDL	10	20
Phenanthrene		<MDL	20	30		<MDL	10	21		<MDL	10	20	540		10	20
Fluorene		<MDL	20	30		<MDL	10	21		<MDL	10	20	48		10	20
Anthracene		<MDL	20	30		<MDL	10	21		<MDL	10	20	110		10	20
HPAHs																
Fluoranthene		<MDL	20	36		<MDL	10	24		<MDL	10	23	480		10	24
Pyrene		<MDL	20	30		<MDL	10	21		<MDL	10	20	570		10	20
Benzo(a)anthracene		<MDL	20	30		<MDL	10	21		<MDL	10	20	170		10	20
Chrysene		<MDL	20	30		<MDL	10	21		<MDL	10	20	190		10	20
Benzo(b)fluoranthene		<MDL	50	90		<MDL	40	61		<MDL	30	58	180		40	60
Benzo(k)fluoranthene		<MDL	50	90		<MDL	40	61		<MDL	30	58	87		40	60
Benzo(a)pyrene		<MDL	30	60		<MDL	20	40		<MDL	20	38	140		20	39
Indeno(1,2,3-Cd)Pyrene		<MDL	30	60		<MDL	20	40		<MDL	20	38	98		20	39
Dibenzo(a,h)anthracene		<MDL	50	90		<MDL	40	61		<MDL	30	58		<MDL	40	60
Benzo(g,h,i)perylene		<MDL	30	60		<MDL	20	40		<MDL	20	38	130		20	39
Other BNA																
Di-N-Butyl Phthalate		<MDL	30	60		<MDL,B	20	40		<MDL,B	20	38		<MDL,B	20	39
Benzyl Butyl Phthalate		<MDL	20	30		<MDL	10	21		<MDL	10	20		<MDL	10	20
Bis(2-Ethylhexyl)Phthalate		<MDL	20	30		<MDL	10	21		<MDL	10	20		<MDL	10	20
Dibenzofuran		<MDL	30	60		<MDL	20	40		<MDL	20	38	20	<RDL	20	39
Benzoic Acid		<MDL	90	180		<MDL	60	120		<MDL	60	120		<MDL	60	120
4-Methylphenol		<MDL	30	60		<MDL	20	40		<MDL	20	38		<MDL	20	39
Carbazole										<MDL	20	38	85		20	39
Coprostanol										<MDL	60	120		<MDL	60	120
PCBs (µg/kg dry weight)																
Aroclor 1254		<MDL	50	100		<MDL	10	21		<MDL	20	38		<MDL	20	39
Aroclor 1248		<MDL	50	100		<MDL	10	21		<MDL	20	38		<MDL	20	39
Aroclor 1260		<MDL	50	100		<MDL	10	21		<MDL	20	38		<MDL	20	39
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)																
Acetone																
Metals (mg/kg dry weight)																
Mercury	0.036				0.02				0.02				0.02			
Aluminum	8000	B			8700				8700	B			9600	B		
Antimony		<MDL,E	1			<MDL,G	4		1.2	E,G			2.4	E,G		
Arsenic	4.8	G			9.8				7				7.1			
Barium	34	B,E			37				30				40			
Beryllium	0.12				0.24				0.23				0.25			
Cadmium		<MDL,L	0			<MDL	0		0.09	L			0.12	L		
Chromium	10				13	E			11				14			
Copper	12				8.5	B			12	B			12	B		
Iron	18000				17000				15000	B			17000	B		
Lead	11				3.7				3.5	E,B			8.6	E,B		
Nickel	12				9.8				11				13			
Selenium		<MDL	1			<MDL	6			<MDL	2			<MDL	2	
Silver		<MDL	0			<MDL	0		0.35				0.36			
Thallium		<MDL E,G	1			<MDL	20		10				12			
Zinc	48	B			44	B			41	B			45	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits

<MDL - Undetected at the method detection limit

B - Blank contamination

G - Low standard reference material recovery

L - High standard reference material recovery

E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

Figures and Tables

TABLE 4-4. Core O: Organic Compounds and Metals, Section O2

Sample Locator	1990 LTBC35				1992 LTBC35				1992 Replicate			
Date Sampled	May 14, 90				May 19, 92				May 19, 92			
Sample Number	9000429				9201191				9201196			
% Solids:	83				87				85			
% TOC	0.08				1.5				0.84			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs												
Naphthalene		<MDL	50	90		<MDL	30	57		<MDL	40	59
Acenaphthene		<MDL	10	24		<MDL	8	15		<MDL	8	15
Acenaphthylene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Phenanthrene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Fluorene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Anthracene		<MDL	20	30		<MDL	10	20		<MDL	10	20
HPAHs												
Fluoranthene		<MDL	20	36		<MDL	10	23		<MDL	10	24
Pyrene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Benzo(a)anthracene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Chrysene		<MDL	20	30		<MDL	10	20		<MDL	10	20
Benzo(b)fluoranthene		<MDL	50	90		<MDL	30	57		<MDL	40	59
Benzo(k)fluoranthene		<MDL	50	90		<MDL	30	57		<MDL	40	59
Benzo(a)pyrene		<MDL	30	60		<MDL	20	38		<MDL	20	39
Indeno(1,2,3-Cd)Pyrene		<MDL	30	60		<MDL	20	38		<MDL	20	39
Dibenzo(a,h)anthracene		<MDL	50	90		<MDL	30	57		<MDL	40	59
Benzo(g,h,i)perylene		<MDL	30	60		<MDL	20	38		<MDL	20	39
Other BNA												
Di-N-Butyl Phthalate		<MDL	30	60		<MDL,B	20	38		<MDL,B	20	39
Benzyl Butyl Phthalate		<MDL	20	30		<MDL	10	20		<MDL	10	20
Bis(2-Ethylhexyl)Phthalate		<MDL	20	30		<MDL	10	20		<MDL	10	20
Dibenzofuran		<MDL	30	60		<MDL	20	38		<MDL	20	39
Benzoic Acid		<MDL	90	180		<MDL	60	110		<MDL	60	120
4-Methylphenol		<MDL	30	60		<MDL	20	38		<MDL	20	39
Carbazole						<MDL	20	38		<MDL	20	39
Coprostanol						<MDL	60	110		<MDL	60	120
PCBs (µg/kg dry weight)												
Aroclor 1254		<MDL	50	100		<MDL	20	38		<MDL	20	39
Aroclor 1248		<MDL	50	100		<MDL	20	38		<MDL	20	39
Aroclor 1260		<MDL	50	100		<MDL	20	38		<MDL	20	39
Volatiles (µg/kg dry weight)												
2-Butanone (MEK)												
Acetone												
Metals (mg/kg dry weight)												
Mercury	0.024					<MDL	0.02			<MDL	0.02	
Aluminum	8200	B			8500	B			8600	B		
Antimony		<MDL,E	1		1.1	E,G			2.4	E,G		
Arsenic	4.8	G			8				7.1			
Barium	42	B,E			33				36			
Beryllium	0.12				0.23				0.24			
Cadmium	0.24	L			0.11	L				<MDL,L	0.1	
Chromium	14				11				13			
Copper	10				11	B			11	B		
Iron	18000				16000	B			15000	B		
Lead	4.8				3.4	E,B			3.5	E,B		
Nickel	14				10				12			
Selenium		<MDL	1			<MDL	1			<MDL	1	
Silver		<MDL	0.4		0.23				0.24			
Thallium		<MDL,E,G	1		10				9.4			
Zinc	47	B			40	B			46	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits

<MDL - Undetected at the method detection limit

B - Blank contamination

G - Low standard reference material recovery

L - High standard reference material recovery

E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-4 (continued). Core O: Organic Compounds and Metals, Sections O3, O4

Sample Locator	O3 1990 LTBC35				O3 1992 LTBC35				O4 1990 LTBC35				O4 1992 LTBC35			
Date Sampled	May 14, 90				May 19, 92				May 14, 90				May 19, 92			
Sample Number	9000430				9201192				9000431				9201193			
% Solids:	82				82				80				79			
% TOC	0.63				0.77				1				1.4			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs																
Naphthalene		<MDL	50	91		<MDL	40	61		<MDL	50	94		<MDL	40	63
Acenaphthene		<MDL	10	24		<MDL	9	16		<MDL	20	31		<MDL	9	16
Acenaphthylene		<MDL	20	30		<MDL	10	21		<MDL	10	25		<MDL	10	22
Phenanthrene		<MDL	20	30		<MDL	10	21		<MDL	20	31	59		10	22
Fluorene		<MDL	20	30		<MDL	10	21		<MDL	20	31		<MDL	10	22
Anthracene		<MDL	20	30		<MDL	10	21		<MDL	20	31		<MDL	10	22
HPAHs																
Fluoranthene		<MDL	20	37		<MDL	10	24		<MDL	20	38	160		10	25
Pyrene		<MDL	20	30		<MDL	10	21		<MDL	20	31	72		10	22
Benzo(a)anthracene		<MDL	20	30		<MDL	10	21		<MDL	20	31	39		10	22
Chrysene		<MDL	20	30		<MDL	10	21		<MDL	20	31	80		10	22
Benzo(b)fluoranthene		<MDL	50	91		<MDL	40	61		<MDL	50	94	50	<RDL	40	63
Benzo(k)fluoranthene		<MDL	50	91		<MDL	40	61		<MDL	50	94		<MDL	40	63
Benzo(a)pyrene		<MDL	30	61		<MDL	20	40		<MDL	30	63	46		30	42
Indeno(1,2,3-Cd)Pyrene		<MDL	3000	6800		<MDL	20	40		<MDL	30	63		<MDL	30	42
Dibenzo(a,h)anthracene		<MDL	30	61		<MDL	40	61		<MDL	50	94		<MDL	40	63
Benzo(g,h,i)perylene		<MDL	30	61		<MDL	20	40		<MDL	30	63		<MDL	30	42
Other BNA																
Di-N-Butyl Phthalate		<MDL	30	61		<MDL,B	20	40		<MDL	30	63		<MDL,B	30	42
Benzyl Butyl Phthalate		<MDL	20	30		<MDL	10	21		<MDL	20	31		<MDL	10	22
Bis(2-Ethylhexyl)Phthalate		<MDL	20	30		<MDL	10	21		<MDL	20	31		<MDL	10	22
Dibenzofuran		<MDL	30	61		<MDL	20	40		<MDL	30	63		<MDL	30	42
Benzoic Acid		<MDL	90	180		<MDL	60	120		<MDL	90	190		<MDL	60	130
4-Methylphenol		<MDL	30	61		<MDL	20	40		<MDL	30	63		<MDL	30	42
Carbazole						<MDL	20	40						<MDL	30	42
Coprostanol						<MDL	60	120						<MDL	60	130
PCBs (µg/kg dry weight)																
Aroclor 1254		<MDL	50	100		<MDL	20	40		<MDL	50	100		<MDL	20	42
Aroclor 1248		<MDL	50	100		<MDL	20	40		<MDL	50	100	30	<RDL	20	42
Aroclor 1260		<MDL	50	100		<MDL	20	40		<MDL	50	100		<MDL	20	42
Volatiles (µg/kg dry weight)																
2-Butanone (MEK)																
Acetone																
Metals (mg/kg dry weight)																
Mercury	0.037				0.024				0.14				0.063			
Aluminum	8400	B			9500	B			9000	B			9500	B		
Antimony		<MDL,E	1		2.4	E,G				<MDL,E	1		1.3	E,G		
Arsenic	4.9	G			7.3				5	G			6.3			
Barium	28	B,E			37				31	B,E			33			
Beryllium	0.12				0.24				0.13				0.25			
Cadmium	0.24	L			0.12	L				<MDL,L	0		0.13	L		
Chromium	12				13				12				14			
Copper	10				12	B			11				14	B		
Iron	18000				16000	B			19000				14000	B		
Lead	7.3				3.7	E,B			6.3				8	E,B		
Nickel	12				12				12				12			
Selenium		<MDL	0.9			<MDL	1		0.63					<MDL	1	
Silver		<MDL	0.4		0.24					<MDL	0		0.51			
Thallium		<MDL,E,G	0.9		11					<MDL,E,G	1		8.9			
Zinc	55	B			46	B			49	B			48	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-5. Core P: Organic Compounds and Metals Below Cap

Sample Locator	1990 LTBC34				1991 LTBC34				1992 LTBC34			
Date Sampled	May 30, 90				May 30, 91				May 19, 92			
Sample Number	9000437				9101238				9201205			
% Solids:	38				72				65			
% TOC	4.1				1.9				4.3			
BNA Organics (µg/kg dry)	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**
LPAHs												
Naphthalene		<MDL	100	200		<MDL	40	69	50	<RDL	50	77
Acenaphthene		<MDL	30	53		<MDL	10	18	51		10	20
Acenaphthylene		<MDL	30	66		<MDL	10	24	51		10	26
Phenanthrene	530		30	66	170		10	24	370		10	26
Fluorene		<MDL	30	66		<MDL	10	24	65		10	26
Anthracene	130		30	66	54		10	24	100		10	26
HPAHs												
Fluoranthene	660		40	79	360		10	28	570		20	31
Pyrene	1000		30	66	390		10	24	1000		10	26
Benzo(a)anthracene	340		30	66	180		10	24	370		10	26
Chrysene	500		30	66	220		10	24	510		10	26
Benzo(b)fluoranthene	610		100	200	260		40	69	880		50	77
Benzo(k)fluoranthene	450		100	200	190		40	69	710		50	77
Benzo(a)pyrene	470		70	130	170		30	46	540		30	51
Indeno(1,2,3-Cd)Pyrene	210		70	130	56		30	46	220		30	51
Dibenzo(a,h)anthracene		<MDL	100	200		<MDL	40	69		<MDL	50	77
Benzo(g,h,i)perylene	180		70	130		<MDL	30	46	230		30	51
Other BNA												
Di-N-Butyl Phthalate		<MDL	70	130	190	B	30	46		<MDL,B	30	51
Benzyl Butyl Phthalate		<MDL	30	66		<MDL	10	24		<MDL	10	26
Bis(2-Ethylhexyl)Phthalate	1200		30	66	2800		10	24	4200		10	26
Dibenzofuran		<MDL	70	130		<MDL	30	46		<MDL	30	51
Benzoic Acid	390		200	390		<MDL	70	140		<MDL	80	150
4-Methylphenol		<MDL	70	130		<MDL	30	46		<MDL	30	51
Carbazole									69		30	51
Coprostanol										<MDL	80	150
PCBs (µg/kg dry weight)												
Aroclor 1254		<MDL	60	110	2100		100	240	260		30	51
Aroclor 1248		<MDL	60	110	1300		100	240	850		30	51
Aroclor 1260		<MDL	60	110	1500		100	240	290		30	51
Volatiles (µg/kg dry weight)												
2-Butanone (MEK)		<MDL	80	130								
Acetone	710		80	130								
Metals (mg/kg dry weight)												
Mercury	0.39				1.3				1			
Aluminum	19000	B			17000				17000	B		
Antimony	1.8					<MDL,G	6		3.1	E,G		
Arsenic	18	G			14				12			
Barium	71	B			110				95			
Beryllium	0.26				0.42				0.35			
Cadmium	0.79	L			1.4				2.5	L		
Chromium	58				60	E			51			
Copper	55				71	B			80	B		
Iron	24000	B			28000				20000	B		
Lead	82				150				150	E,B		
Nickel	55				51				49			
Selenium	1.6					<MDL	7			<MDL	2	
Silver	2.6				12				7.2			
Thallium		<MDL,E	2		28				15			
Zinc	110				190	B			250	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-5 (continued). Core P: Organic Compounds and Metals, Section P1

Sample Locator	1990 LTBC34				1991 LTBC34				1992 LTBC34			
Date Sampled	May 30, 90				May 30, 91				May 19, 92			
Sample Number	9000438				9101239				9201206			
% Solids:	80				85				75			
% TOC	4.1				0.18				1.1			
BNA Organics (µg/kg dry)	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**	**Value**	**Qual**	**MDL**	**RDL**
LPAHs												
Naphthalene		<MDL	50	89		<MDL	40	59		<MDL	40	67
Acenaphthene		<MDL	10	24		<MDL	8	15		<MDL	9	17
Acenaphthylene		<MDL	20	30		<MDL	10	20		<MDL	10	23
Phenanthrene		<MDL	20	30	48		10	20		<MDL	10	23
Fluorene		<MDL	20	30		<MDL	10	20		<MDL	10	23
Anthracene		<MDL	20	30		<MDL	10	20		<MDL	10	23
HPAHs												
Fluoranthene	40		20	36	51		10	24		<MDL	10	27
Pyrene	33		20	30	35		10	20		<MDL	10	23
Benzo(a)anthracene		<MDL	20	30	24		10	20		<MDL	10	23
Chrysene		<MDL	20	30	24		10	20		<MDL	10	23
Benzo(b)fluoranthene		<MDL	50	89		<MDL	40	59		<MDL	40	67
Benzo(k)fluoranthene		<MDL	50	89		<MDL	40	59		<MDL	40	67
Benzo(a)pyrene		<MDL	30	60		<MDL	20	39		<MDL	30	44
Indeno(1,2,3-Cd)Pyrene		<MDL	30	60		<MDL	20	39		<MDL	30	44
Dibenzo(a,h)anthracene		<MDL	50	89		<MDL	40	59		<MDL	40	67
Benzo(g,h,i)perylene		<MDL	30	60		<MDL	20	39		<MDL	30	44
Other BNA												
Di-N-Butyl Phthalate		<MDL	30	60		<MDL,B	20	39		<MDL,B	30	44
Benzyl Butyl Phthalate		<MDL	20	30		<MDL	10	20		<MDL	10	23
Bis(2-Ethylhexyl)Phthalate		<MDL	20	30		<MDL	10	20		<MDL	10	23
Dibenzofuran		<MDL	30	60		<MDL	20	39		<MDL	30	44
Benzoic Acid		<MDL	90	180		<MDL	60	120		<MDL	70	130
4-Methylphenol		<MDL	30	60		<MDL	20	39		<MDL	30	44
Carbazole										<MDL	30	44
Coprostanol										<MDL	70	130
PCBs (µg/kg dry weight)												
Aroclor 1254		<MDL	20	31		<MDL	10	20		<MDL	20	44
Aroclor 1248		<MDL	20	31		<MDL	10	20		<MDL	20	44
Aroclor 1260		<MDL	20	31		<MDL	10	20		<MDL	20	44
Volatiles (µg/kg dry weight)												
2-Butanone (MEK)												
Acetone												
Metals (mg/kg dry weight)												
Mercury	0.025				0.024					<MDL	0.03	
Aluminum	10000	B			9300				10000	B		
Antimony		<MDL	0.8			<MDL,G	4		1.3	E,G		
Arsenic	3.8	G			9.4				8			
Barium	33	B			36				45			
Beryllium	0.13				0.24				0.28			
Cadmium		<MDL,L	0.3			<MDL	0.2		0.13	L		
Chromium	14				13	E			12			
Copper	11				11	B			13	B		
Iron	18000	B			20000				17000	B		
Lead	5				5.9				8.4	E,B		
Nickel	12				12				12			
Selenium		<MDL	0.8			<MDL	6			<MDL	3	
Silver		<MDL	0.4			<MDL	0.4		0.27			
Thallium		<MDL,E	1			<MDL	20		12			
Zinc	46				47	B			49	B		

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits
<MDL - Undetected at the method detection limit
B - Blank contamination
G - Low standard reference material recovery
L - High standard reference material recovery
E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-6. Core P: Organic Compounds and Metals, Sections P2, P3, P4

Sample Locator	P2 1990 LTBC34				P3 1990 LTBC34				P4 1990 LTBC34			
Date Sampled	May 30, 90				May 30, 90				May 30, 90			
Sample Number	9000439				9000440				9000441			
% Solids:	76				67				79			
% TOC	0.17				2.7				0.15			
BNA Organics (µg/kg dry)	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL	Value	Qual	MDL	RDL
LPAHs												
Naphthalene		<MDL	50	93		<MDL	60	110		<MDL	50	95
Acenaphthene		<MDL	10	25		<MDL	10	30		<MDL	10	25
Acenaphthylene		<MDL	20	32		<MDL	20	37		<MDL	20	32
Phenanthrene		<MDL	20	32	450		20	37		<MDL	20	32
Fluorene		<MDL	20	32	48		20	37		<MDL	20	32
Anthracene		<MDL	20	32	63		20	37		<MDL	20	32
HPAHs												
Fluoranthene		<MDL	20	38	720		20	45		<MDL	20	38
Pyrene		<MDL	20	32	430		20	37		<MDL	20	32
Benzo(a)anthracene		<MDL	20	32	220		20	37		<MDL	20	32
Chrysene		<MDL	20	32	370		20	37		<MDL	20	32
Benzo(b)fluoranthene		<MDL	50	93	390		60	110		<MDL	50	95
Benzo(k)fluoranthene		<MDL	50	93	340		60	110		<MDL	50	95
Benzo(a)pyrene		<MDL	30	63	280		40	75		<MDL	30	63
Indeno(1,2,3-Cd)Pyrene		<MDL	30	63	130		40	75		<MDL	30	63
Dibenzo(a,h)anthracene		<MDL	50	93		<MDL	60	110		<MDL	50	95
Benzo(g,h,i)perylene		<MDL	30	63	110		40	75		<MDL	30	63
Other BNA												
Di-N-Butyl Phthalate		<MDL	30	63		<MDL	40	75		<MDL	30	63
Benzyl Butyl Phthalate		<MDL	20	32		<MDL	20	37		<MDL	20	32
Bis(2-Ethylhexyl)Phthalate		<MDL	20	32	870		20	37		<MDL	20	32
Dibenzofuran		<MDL	30	63		<MDL	40	75		<MDL	30	63
Benzoic Acid		<MDL	90	180	400		100	220		<MDL	90	190
4-Methylphenol		<MDL	30	63	79		40	75		<MDL	30	63
Carbazole												
Coprostanol												
PCBs (µg/kg dry weight)												
Aroclor 1254		<MDL	20	33		<MDL	20	37		<MDL	20	32
Aroclor 1248		<MDL	20	33		<MDL	20	37		<MDL	20	32
Aroclor 1260		<MDL	20	33		<MDL	20	37		<MDL	20	32
Volatiles (µg/kg dry weight)												
2-Butanone (MEK)												
Acetone												
Metals (mg/kg dry weight)												
Mercury	0.026				0.1				0.025			
Aluminum	12000	B			16000	B			11000	B		
Antimony		<MDL	1			<MDL	1			<MDL	0.9	
Arsenic	2.6	G			4.5	G			2.5	G		
Barium	32	B			54	B			38	B		
Beryllium	0.13				0.3				0.13			
Cadmium		<MDL,L	0.3		0.3	L				<MDL,L	0.3	
Chromium	14				24				16			
Copper	12				22				10			
Iron	20000	B			24000	B			19000	B		
Lead	6.6				15				5.1			
Nickel	14				18				14			
Selenium		<MDL	0.8		0.9					<MDL	0.8	
Silver		<MDL	0.4		0.45					<MDL	0.4	
Thallium		<MDL,E	1			<MDL,E	1			<MDL,E	1	
Zinc	54				75				51			

In 1990 antimony, arsenic, selenium, and thallium were analyzed using GFAA methods. See Appendix E.

<RDL - Detected below quantification limits

<MDL - Undetected at the method detection limit

B - Blank contamination

G - Low standard reference material recovery

L - High standard reference material recovery

E - Estimate based on high relative percent difference in duplicate, high relative standard deviation in triplicate, or high or low surrogate recoveries

TABLE 4-7. N Core: 1990 Comparisons to Sediment Standards, Below Cap and Sections N1 and N2

Section/Locator	N Below Cap LTBD24		N1 LTBD24		N2 LTBD24		Marine Sediment Standards	
Date Sampled	May 14, 90		May 14, 90		May 14, 90			
Sample Number	9000432		9000433		9000434			
% Solids	69		81		79			
% TOC	2.4		1.4		0.15		SQS	CSL
Parameters	Value	Qual	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC								
Naphthalene	3	<MDL	4	<MDL	30	<MDL	99	170
Acenaphthene	4.6		0.7	<MDL	7	<MDL	16	57
Acenaphthylene	2.3		1	<MDL	10	<MDL	66	66
Phenanthrene	31		3.1		10	<MDL	100	480
Fluorene	4.6		1	<MDL	10	<MDL	23	79
Anthracene	13		1	<MDL	10	<MDL	220	1,200
2-Methylnaphthalene	3	<MDL	4	<MDL	30	<MDL	38	64
Total LPAHs	61.5		14.8		107		370	780
HPAHs mg/Kg OC								
Fluoranthene	58		1	<MDL	10	<MDL	160	1,200
Pyrene	50		1	<MDL	10	<MDL	1,000	1,400
Benzo(a)anthracene	25		1	<MDL	10	<MDL	110	270
Chrysene	41		1	<MDL	10	<MDL	110	460
Total benzofluoranthenes	92		7.2		66		230	450
Benzo(a)pyrene	35		2	<MDL	20	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	9.2		2	<MDL	20	<MDL	34	88
Dibenzo(a,h)anthracene	3	<MDL	4	<MDL	30	<MDL	12	33
Benzo(g,h,i)perylene	6.7		2	<MDL	20	<MDL	31	78
Total HPAHs	319.9		21.2		196		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	0.8	<MDL	1	<MDL	10	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.8	<MDL	1	<MDL	10	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.8	<MDL	1	<MDL	10	<MDL	0.81	1.8
Hexachlorobenzene	0.8	<MDL	1	<MDL	10	<MDL	0.38	2.3
Diethyl Phthalate	2.0	<MDL	2	<MDL	20	<MDL	61	110
Dimethyl Phthalate	0.4	<MDL	0.6	<MDL	6	<MDL	53	53
Di-N-Butyl Phthalate	2.0	<MDL	2	<MDL	20	<MDL	220	1,700
Benzyl Butyl Phthalate	12		1	<MDL	10	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	150		1	<MDL	10	<MDL	47	78
Di-N-Octyl Phthalate	0.8	<MDL	1	<MDL	10	<MDL	58	4,500
Dibenzofuran	2.0	<MDL	2	<MDL	20	<MDL	15	58
Hexachlorobutadiene	2.0	<MDL	2	<MDL	20	<MDL	3.9	6.2
N-Nitrosodiphenylamine	2.0	<MDL	2	<MDL	20	<MDL	11	11
Total PCBs	58		NA		40	<MDL	12	65
Dry weight µg/Kg								
Phenol	100	<MDL	90	<MDL	90	<MDL	420	1,200
2-Methylphenol	40	<MDL	30	<MDL	30	<MDL	63	63
4-Methylphenol	40	<MDL	30	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	40	<MDL	30	<MDL	30	<MDL	29	29
Pentachlorophenol	40	<MDL,L	30	<MDL,L	30	<MDL,L	360	690
Benzyl Alcohol	40	<MDL	30	<MDL	30	<MDL	57	73
Benzoic Acid	350		310		90	<MDL	650	650
Metals mg/kg dry weight								
Mercury	0.99		0.049		0.051		0.41	0.59
Arsenic	8.7	G	6.2	G	5.1	G	57	93
Cadmium	1.4	L	0.37	L	0.3	<MDL,L	5.1	6.7
Chromium	45		15		14		260	270
Copper	77		12		11		390	390
Lead	160		6.2		6.3		450	530
Silver	6.5		0.49		0.4	<MDL	6.1	6.1
Zinc	190	B	49	B	49	B	410	960

NA - Not Available | Exceeds SQS | Exceeds CSL

TABLE 4-7 (continued). N Core: 1990 Comparison to Sediment Standards, Sections N3 and N4

Section/Locator	N3 LTBD24		N4 LTBD24		Marine Sediment Standards	
Date Sampled	May 14, 90		May 14, 90			
Sample Number	9000435		9000436			
% Solids	73		71			
% TOC	1.1		2.5		SQS	CSL
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	5	<MDL	2	<MDL	99	170
Acenaphthene	0.9	<MDL	0.4	<MDL	16	57
Acenaphthylene	2	<MDL	0.8	<MDL	66	66
Phenanthrene	5.3		0.8	<MDL	100	480
Fluorene	2	<MDL	0.8	<MDL	23	79
Anthracene	2	<MDL	0.8	<MDL	220	1,200
2-Methylnaphthalene	5	<MDL	2	<MDL	38	64
Total LPAHs	22.2		7.6		370	780
HPAHs mg/Kg OC						
Fluoranthene	6.7		1.8		160	1,200
Pyrene	6		1.8		1,000	1,400
Benzo(a)anthracene	2	<MDL	0.8	<MDL	110	270
Chrysene	3.8		0.8	<MDL	110	460
Total benzofluoranthenes	9		4		230	450
Benzo(a)pyrene	3	<MDL	2	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	3	<MDL	2	<MDL	34	88
Dibenzo(a,h)anthracene	5	<MDL	2	<MDL	12	33
Benzo(g,h,i)perylene	3	<MDL	2	<MDL	31	78
Total HPAHs	41.5		17.2		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	2	<MDL	0.8	<MDL	2.3	2.3
1,4-Dichlorobenzene	2	<MDL	0.8	<MDL	3.1	9
1,2,4-Trichlorobenzene	2	<MDL	0.8	<MDL	0.81	1.8
Hexachlorobenzene	2	<MDL	0.8	<MDL	0.38	2.3
Diethyl Phthalate	3	<MDL	2	<MDL	61	110
Dimethyl Phthalate	0.9	<MDL	0.4	<MDL	53	53
Di-N-Butyl Phthalate	3	<MDL	2	<MDL	220	1,700
Benzyl Butyl Phthalate	2	<MDL	0.8	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	2	<MDL	0.8	<MDL	47	78
Di-N-Octyl Phthalate	2	<MDL	0.8	<MDL	58	4,500
Dibenzofuran	3	<MDL	2	<MDL	15	58
Hexachlorobutadiene	3	<MDL	2	<MDL	3.9	6.2
N-Nitrosodiphenylamine	3	<MDL	2	<MDL	11	11
Total PCBs	5	<MDL	2	<MDL	12	65
Dry weight µg/Kg						
Phenol	100	<MDL	100	<MDL	420	1,200
2-Methylphenol	30	<MDL	40	<MDL	63	63
4-Methylphenol	100		40	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	40	<MDL	29	29
Pentachlorophenol	30	<MDL,L	40	<MDL,L	360	690
Benzyl Alcohol	30	<MDL	40	<MDL	57	73
Benzoic Acid	270		280		650	650
Metals mg/kg dry weight						
Mercury	0.055		0.056		0.41	0.59
Arsenic	5.5	G	5.6	G	57	93
Cadmium	0.27	L	0.28	L	5.1	6.7
Chromium	13		14		260	270
Copper	12		15		390	390
Lead	6.8		9.9		450	530
Silver	0.4	<MDL	0.4	<MDL	6.1	6.1
Zinc	51	B	55	B	410	960
	Exceeds SQS		Exceeds CSL			

TABLE 4-8. O Core: 1990 Comparison to Sediment Standards, Below Cap and Sections O1 and O2

Section/Locator	O Below Cap LTBC35		O1 LTBC35		O2 LTBC35		Marine Sediment Standards	
Date Sampled	May 14, 90		May 14, 90		May 14, 90			
Sample Number	9000427		9000428		9000429			
% Solids	60		83		83			
% TOC	2.8		0.1		0.08		SQS	CSL
Parameters	Value	Qual	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC								
Naphthalene	4	<MDL	50	<MDL	60	<MDL	99	170
Acenaphthene	5.4		10	<MDL	10	<MDL	16	57
Acenaphthylene	5		20	<MDL	30	<MDL	66	66
Phenanthrene	64		20	<MDL	30	<MDL	100	480
Fluorene	8.2		20	<MDL	30	<MDL	23	79
Anthracene	43		20	<MDL	30	<MDL	220	1,200
2-Methylnaphthalene	4	<MDL	50	<MDL	60	<MDL	38	64
Total LPAHs	133.6		190		250		370	780
HPAHs mg/Kg OC								
Fluoranthene	190		20	<MDL	30	<MDL	160	1,200
Pyrene	210		20	<MDL	30	<MDL	1,000	1,400
Benzo(a)anthracene	100		20	<MDL	30	<MDL	110	270
Chrysene	140		20	<MDL	30	<MDL	110	460
Total benzofluoranthenes	250		100		126		230	450
Benzo(a)pyrene	96		30	<MDL	40	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	25		30	<MDL	40	<MDL	34	88
Dibenzo(a,h)anthracene	4	<MDL	50	<MDL	60	<MDL	12	33
Benzo(g,h,i)perylene	19		30	<MDL	40	<MDL	31	78
Total HPAHs	1034		320		426		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	1	<MDL	20	<MDL	30	<MDL	2.3	2.3
1,4-Dichlorobenzene	1	<MDL	20	<MDL	30	<MDL	3.1	9
1,2,4-Trichlorobenzene	1	<MDL	20	<MDL	30	<MDL	0.81	1.8
Hexachlorobenzene	3	<MDL	20	<MDL	30	<MDL	0.38	2.3
Diethyl Phthalate	3	<MDL	30	<MDL	40	<MDL	61	110
Dimethyl Phthalate	1	<MDL	9	<MDL	10	<MDL	53	53
Di-N-Butyl Phthalate	3	<MDL	30	<MDL	40	<MDL	220	1,700
Benzyl Butyl Phthalate	30		20	<MDL	30	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	390		20	<MDL	30	<MDL	47	78
Di-N-Octyl Phthalate	1	<MDL	200	<MDL	300	<MDL	58	4,500
Dibenzofuran	3	<MDL	30	<MDL	40	<MDL	15	58
Hexachlorobutadiene	3	<MDL	30	<MDL	40	<MDL	3.9	6.2
N-Nitrosodiphenylamine	3	<MDL	30	<MDL	40	<MDL	11	11
Total PCBs	46		50	<MDL	60	<MDL	12	65
Dry weight µg/Kg								
Phenol	300	<MDL	90	<MDL	90	<MDL	420	1,200
2-Methylphenol	80	<MDL	30	<MDL	30	<MDL	63	63
4-Methylphenol	80	<MDL	30	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	80	<MDL	30	<MDL	30	<MDL	29	29
Pentachlorophenol	80	<MDL,L	30	<MDL,L	30	<MDL,L	360	690
Benzyl Alcohol	80	<MDL	30	<MDL	30	<MDL	57	73
Benzoic Acid	1100		90	<MDL	90	<MDL	650	650
Metals mg/kg dry weight								
Mercury	1.8		0.036		0.024		0.41	0.59
Arsenic	13	G	4.8	G	4.8	G	57	93
Cadmium	4.8	L	0.2	<MDL,L	0.24	L	5.1	6.7
Chromium	55		10		14		260	270
Copper	160		12		10		390	390
Lead	480		11		4.8		450	530
Silver	17		0.4	<MDL	0.4	<MDL	6.1	6.1
Zinc	320	B	48	B	47	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-8 (continued). O Core: 1990 Comparison to Sediment Standards, Sections O3 and O4

Section/Locator	O3 LTBC35		O4 LTBC35		Marine Sediment Standards	
Date Sampled	May 14, 90		May 14, 90			
Sample Number	9000430		9000431			
% Solids	82		80		SQS Table I	CSL Table III
% TOC	0.63		1			
Parameters	Value	Qual	Value	Qual		
LPAHs mg/Kg OC						
Naphthalene	8	<MDL	5	<MDL	99	170
Acenaphthene	2	<MDL	1	<MDL	16	57
Acenaphthylene	3	<MDL	2	<MDL	66	66
Phenanthrene	3	<MDL	2	<MDL	100	480
Fluorene	3	<MDL	2	<MDL	23	79
Anthracene	3	<MDL	2	<MDL	220	1,200
2-Methylnaphthalene	8	<MDL	5	<MDL	38	64
Total LPAHs	30		19		370	780
HPAHs mg/Kg OC						
Fluoranthene	3	<MDL	2	<MDL	160	1,200
Pyrene	3	<MDL	2	<MDL	1,000	1,400
Benzo(a)anthracene	3	<MDL	2	<MDL	110	270
Chrysene	3	<MDL	2	<MDL	110	460
Total benzofluoranthenes	15.8		10		230	450
Benzo(a)pyrene	5	<MDL	3	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	500	<MDL	3	<MDL	34	88
Dibenzo(a,h)anthracene	5	<MDL	5	<MDL	12	33
Benzo(g,h,i)perylene	5	<MDL	3	<MDL	31	78
Total HPAHs	542.8		32		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	3	<MDL	2	<MDL	2.3	2.3
1,4-Dichlorobenzene	3	<MDL	2	<MDL	3.1	9
1,2,4-Trichlorobenzene	3	<MDL	2	<MDL	0.81	1.8
Hexachlorobenzene	3	<MDL	2	<MDL	0.38	2.3
Diethyl Phthalate	5	<MDL	3	<MDL	61	110
Dimethyl Phthalate	1	<MDL	0.9	<MDL	53	53
Di-N-Butyl Phthalate	5	<MDL	3	<MDL	220	1,700
Benzyl Butyl Phthalate	3	<MDL	2	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	3	<MDL	2	<MDL	47	78
Di-N-Octyl Phthalate	3	<MDL	2	<MDL	58	4,500
Dibenzofuran	5	<MDL	3	<MDL	15	58
Hexachlorobutadiene	5	<MDL	3	<MDL	3.9	6.2
N-Nitrosodiphenylamine	5	<MDL	3	<MDL	11	11
Total PCBs	8	<MDL	5	<MDL	12	65
Dry weight µg/Kg						
Phenol	90	<MDL	90	<MDL	420	1,200
2-Methylphenol	30	<MDL	30	<MDL	63	63
4-Methylphenol	30	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	30	<MDL	29	29
Pentachlorophenol	30	<MDL,L	30	<MDL,L	360	690
Benzyl Alcohol	30	<MDL	30	<MDL	57	73
Benzoic Acid	90	<MDL	90	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.037		0.14		0.41	0.59
Arsenic	4.9	G	5	G	57	93
Cadmium	0.24	L	0.3	<MDL,L	5.1	6.7
Chromium	12		12		260	270
Copper	10		11		390	390
Lead	7.3		6.3		450	530
Silver	0.4	<MDL	0.4	<MDL	6.1	6.1
Zinc	55	B	49	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-9. P Core: 1990 Comparison to Sediment Standards, Below Cap and Sections P1 and P2

Section/Locator	P Below Cap LTBC34		P1 LTBC34		P2 LTBC34		Marine Sediment Standards	
Date Sampled	May 30, 90		May 30, 90		May 30, 90			
Sample Number	9000437		9000438		9000439			
% Solids	38		80		76			
% TOC	4.1		0.11		0.17		SQS	CSL
Parameters	Value	Qual	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC								
Naphthalene	2	<MDL	50	<MDL	30	<MDL	99	170
Acenaphthene	0.7	<MDL	9	<MDL	6	<MDL	16	57
Acenaphthylene	0.7	<MDL	20	<MDL	10	<MDL	66	66
Phenanthrene	13		20	<MDL	10	<MDL	100	480
Fluorene	0.7	<MDL	20	<MDL	10	<MDL	23	79
Anthracene	3.2		20	<MDL	10	<MDL	220	1,200
2-Methylnaphthalene	2	<MDL	50	<MDL	30	<MDL	38	64
Total LPAHs	22.3		189		106		370	780
HPAHs mg/Kg OC								
Fluoranthene	16		36		10	<MDL	160	1,200
Pyrene	24		30		10	<MDL	1,000	1,400
Benzo(a)anthracene	8.3		20	<MDL	10	<MDL	110	270
Chrysene	12		20	<MDL	10	<MDL	110	460
Total benzofluoranthenes	26		90		58		230	450
Benzo(a)pyrene	11		30	<MDL	20	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	5.1		30	<MDL	20	<MDL	34	88
Dibenzo(a,h)anthracene	2	<MDL	50	<MDL	30	<MDL	12	33
Benzo(g,h,i)perylene	4.4		30	<MDL	20	<MDL	31	78
Total HPAHs	108.8		336		188		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	0.7	<MDL	20	<MDL	10	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.7	<MDL,G	20	<MDL,G	10	<MDL,G	3.1	9
1,2,4-Trichlorobenzene	0.7	<MDL,G	20	<MDL,G	10	<MDL,G	0.81	1.8
Hexachlorobenzene	0.7	<MDL	20	<MDL	10	<MDL	0.38	2.3
Diethyl Phthalate	2	<MDL	30	<MDL	20	<MDL	61	110
Dimethyl Phthalate	0.5	<MDL	8	<MDL	5	<MDL	53	53
Di-N-Butyl Phthalate	2	<MDL	30	<MDL	20	<MDL	220	1,700
Benzyl Butyl Phthalate	0.7	<MDL	20	<MDL	10	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	29		20	<MDL	10	<MDL	47	78
Di-N-Octyl Phthalate	0.7	<MDL	20	<MDL	10	<MDL	58	4,500
Dibenzofuran	2	<MDL	30	<MDL	20	<MDL	15	58
Hexachlorobutadiene	2	<MDL	30	<MDL	20	<MDL	3.9	6.2
N-Nitrosodiphenylamine	2	<MDL	30	<MDL	20	<MDL	11	11
Total PCBs	2	<MDL	20	<MDL	10	<MDL	12	65
Dry weight µg/Kg								
Phenol	200	<MDL	90	<MDL	90	<MDL	420	1,200
2-Methylphenol	70	<MDL	30	<MDL	30	<MDL	63	63
4-Methylphenol	70	<MDL	30	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	70	<MDL	30	<MDL	30	<MDL	29	29
Pentachlorophenol	70	<MDL	30	<MDL	30	<MDL	360	690
Benzyl Alcohol	70	<MDL	30	<MDL	30	<MDL	57	73
Benzoic Acid	390		90	<MDL	90	<MDL	650	650
Metals mg/kg dry weight								
Mercury	0.39		0.025		0.026		0.41	0.59
Arsenic	18	G	3.8	G	2.6	G	57	93
Cadmium	0.79	L	0.3	<MDL,L	0.3	<MDL,L	5.1	6.7
Chromium	58		14		14		260	270
Copper	55		11		12		390	390
Lead	82		5		6.6		450	530
Silver	2.6		0.4	<MDL	0.4	<MDL	6.1	6.1
Zinc	110		46		54		410	960

Exceeds SQS | Exceeds CSL

TABLE 4-9 (continued). P Core: 1990 Comparison to Sediment Standards, Sections P3 and P4

Section/Locator	P3 LTBC34		P4 LTBC34		Marine Sediment Standards	
Date Sampled	May 30, 90		May 30, 90			
Sample Number	9000440		9000441			
% Solids	67		79		SQS	CSL
% TOC	2.7		0.15			
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	2.0	<MDL	30	<MDL	99	170
Acenaphthene	0.4	<MDL	7.0	<MDL	16	57
Acenaphthylene	0.7	<MDL	10	<MDL	66	66
Phenanthrene	17		10	<MDL	100	480
Fluorene	1.8		10	<MDL	23	79
Anthracene	2.3		10	<MDL	220	1,200
2-Methylnaphthalene	2.0	<MDL	30	<MDL	38	64
Total LPAHs	26.2		107.0		370	780
HPAHs mg/Kg OC						
Fluoranthene	27		10	<MDL	160	1,200
Pyrene	16		10	<MDL	1,000	1,400
Benzo(a)anthracene	8.1		10	<MDL	110	270
Chrysene	14		10	<MDL	110	460
Total benzofluoranthenes	27		66		230	450
Benzo(a)pyrene	10		20	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	4.8		20	<MDL	34	88
Dibenzo(a,h)anthracene	2	<MDL	30	<MDL	12	33
Benzo(g,h,i)perylene	4.1		20	<MDL	31	78
Total HPAHs	113		196		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.7	<MDL	10	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.7	<MDL,G	10	<MDL,G	3.1	9
1,2,4-Trichlorobenzene	0.7	<MDL,G	10	<MDL,G	0.81	1.8
Hexachlorobenzene	0.7	<MDL	10	<MDL	0.38	2.3
Diethyl Phthalate	2.0	<MDL	20	<MDL	61	110
Dimethyl Phthalate	0.4	<MDL	6	<MDL	53	53
Di-N-Butyl Phthalate	2.0	<MDL	20	<MDL	220	1,700
Benzyl Butyl Phthalate	0.7	<MDL	10	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	32		10	<MDL	47	78
Di-N-Octyl Phthalate	0.7	<MDL	10	<MDL	58	4,500
Dibenzofuran	2.0	<MDL	20	<MDL	15	58
Hexachlorobutadiene	2.0	<MDL	20	<MDL	3.9	6.2
N-Nitrosodiphenylamine	2.0	<MDL	20	<MDL	11	11
Total PCBs	0.7	<MDL	10	<MDL	12	65
Dry weight µg/Kg						
Phenol	100	<MDL	90	<MDL	420	1,200
2-Methylphenol	40	<MDL	30	<MDL	63	63
4-Methylphenol	79		30	<MDL	670	670
2,4-Dimethylphenol	40	<MDL	30	<MDL	29	29
Pentachlorophenol	40	<MDL	30	<MDL	360	690
Benzyl Alcohol	40	<MDL	30	<MDL	57	73
Benzoic Acid	400		90	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.1		0.025		0.41	0.59
Arsenic	4.5	G	2.5	G	57	93
Cadmium	0.3	L	0.3	<MDL,L	5.1	6.7
Chromium	24		16		260	270
Copper	22		10		390	390
Lead	15		5.1		450	530
Silver	0.45		0.4	<MDL	6.1	6.1
Zinc	75		51		410	960

Exceeds SQS   Exceeds CSL

Table 4-10. N Core: 1991 Comparison to Sediment Standards Below Cap and Section N1

Section/Locator	N Below Cap LTBC34		N1 LTBC34		Marine Sediment Standards	
Date Sampled	May 30, 91		May 30, 91			
Sample Number	9101228		9101229			
% Solids	44		81			
% TOC	4.8		0.81		SQS	CSL
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	1.5	<MDL	5	<MDL	99	170
Acenaphthene	0.42	<MDL	1	<MDL	16	57
Acenaphthylene	0.42	<MDL	1	<MDL	66	66
Phenanthrene	4.2		3.8		100	480
Fluorene	0.42	<MDL	1	<MDL	23	79
Anthracene	1.3		1	<MDL	220	1,200
2-Methylnaphthalene	1.5	<MDL	5	<MDL	38	64
Total LPAHs	9.76		17.8		370	780
HPAHs mg/Kg OC						
Fluoranthene	5.2		5.7		160	1,200
Pyrene	7.5		6.3		1,000	1,400
Benzo(a)anthracene	3.8		2.5		110	270
Chrysene	6.3		2.5		110	460
Total benzofluoranthenes	11.9		10	<MDL	230	450
Benzo(a)pyrene	5.2		3	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	2.1		3	<MDL	34	88
Dibenzo(a,h)anthracene	2	<MDL	5	<MDL	12	33
Benzo(g,h,i)perylene	1.7		3	<MDL	31	78
Total HPAHs	45.7		41		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.4	<MDL	1	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.4	<MDL,G	1	<MDL,G	3.1	9
1,2,4-Trichlorobenzene	0.4	<MDL	1	<MDL	0.81	1.8
Hexachlorobenzene	0.4	<MDL	1	<MDL	0.38	2.3
Diethyl Phthalate	1	<MDL	3	<MDL	61	110
Dimethyl Phthalate	0.2	<MDL	0.7	<MDL	53	53
Di-N-Butyl Phthalate	1	<MDL,B	3	<MDL,B	220	1,700
Benzyl Butyl Phthalate	0.4	<MDL	1	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	12		33		47	78
Di-N-Octyl Phthalate	0.4	<MDL	1	<MDL	58	4,500
Dibenzofuran	1	<MDL	3	<MDL	15	58
Hexachlorobutadiene	1	<MDL	3	<MDL	3.9	6.2
N-Nitrosodiphenylamine	1	<MDL	3	<MDL	11	11
Total PCBs	14.8		19.5		12	65
Dry weight µg/Kg						
Phenol	100	<MDL	60	<MDL	420	1,200
2-Methylphenol	50	<MDL	20	<MDL	63	63
4-Methylphenol	50	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	50	<MDL	20	<MDL	29	29
Pentachlorophenol	50	<MDL	20	<MDL	360	690
Benzyl Alcohol	50	<MDL	20	<MDL	57	73
Benzoic Acid	100	<MDL	60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	1.1		0.31		0.41	0.59
Arsenic	20		6	<MDL	57	93
Cadmium	0.45		0.5	<MDL	5.1	6.7
Chromium	48	E	6.2	E	260	270
Copper	66	B	5.1	B	390	390
Lead	68		4.9		450	530
Silver	2		0.99		6.1	6.1
Zinc	100	B	22	B	410	960

Exceeds SQS | Exceeds CSL

Figures and Tables

TABLE 4-10 (continued). O Core: 1991 Comparison to Sediment Standards, Below Cap and Sections O1 and O2						
Section/Locator	**O Below Cap LTBC35**		**O1 LTBC35**		**Marine Sediment Standards**	
Date Sampled	**May 30, 91**		**May 30, 91**			
Sample Number	**9101233**		**9101234**			
% Solids	**78**		**82**		**SQS Table I**	**CSL Table III**
% TOC	**1**		**0.08**			
Parameters	**Value**	**Qual**	**Value**	**Qual**		
LPAHs mg/Kg OC						
Naphthalene	4	<MDL	50	<MDL	99	170
Acenaphthene	2.7		10	<MDL	16	57
Acenaphthylene	4.9		10	<MDL	66	66
Phenanthrene	47		10	<MDL	100	480
Fluorene	4.5		10	<MDL	23	79
Anthracene	12		10	<MDL	220	1,200
2-Methylnaphthalene	4	<MDL	50	<MDL	38	64
Total LPAHs	79.1		150		370	780
HPAHs mg/Kg OC						
Fluoranthene	49		10	<MDL	160	1,200
Pyrene	62		10	<MDL	1,000	1,400
Benzo(a)anthracene	45		10	<MDL	110	270
Chrysene	65		10	<MDL	110	460
Total benzofluoranthenes	101		100	<MDL	230	450
Benzo(a)pyrene	41		30	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	14		30	<MDL	34	88
Dibenzo(a,h)anthracene	4	<MDL	50	<MDL	12	33
Benzo(g,h,i)perylene	14		30	<MDL	31	78
Total HPAHs	395		280		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	1	<MDL	10	<MDL	2.3	2.3
1,4-Dichlorobenzene	1	<MDL,G	10	<MDL,G	3.1	9
1,2,4-Trichlorobenzene	1	<MDL	10	<MDL	0.81	1.8
Hexachlorobenzene	1	<MDL	10	<MDL	0.38	2.3
Diethyl Phthalate	3	<MDL	30	<MDL	61	110
Dimethyl Phthalate	0.6	<MDL	8	<MDL	53	53
Di-N-Butyl Phthalate	3	<MDL,B	30	<MDL,B	220	1,700
Benzyl Butyl Phthalate	28		10	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	150		10	<MDL	47	78
Di-N-Octyl Phthalate	1	<MDL	10	<MDL	58	4,500
Dibenzofuran	3	<MDL	30	<MDL	15	58
Hexachlorobutadiene	3	<MDL	30	<MDL	3.9	6.2
N-Nitrosodiphenylamine	3	<MDL	30	<MDL	11	11
Total PCBs	49		10	<MDL	12	65
Dry weight µg/Kg						
Phenol	60	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	57	73
Benzoic Acid	60	<MDL	60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.55		0.024		0.41	0.59
Arsenic	13		9.8		57	93
Cadmium	1		0.4	<MDL	5.1	6.7
Chromium	46	E	13	E	260	270
Copper	63	B	8.5	B	390	390
Lead	120		3.7		450	530
Silver	5.1		0.4	<MDL	6.1	6.1
Zinc	120	B	44	B	410	960

Exceeds SQS   Exceeds CSL

TABLE 4-10 (continued). P Core: 1991 Comparison to Sediment Standards, Below Cap and Sections P1

Section/Locator	P Below Cap LTBD24		P1 LTBD24		Marine Sediment Standards	
Date Sampled	May 30, 91		May 30, 91			
Sample Number	9101238		9101239			
% Solids	72		85			
% TOC	1.9		0.18		SQS	CSL
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	2	<MDL	20	<MDL	99	170
Acenaphthene	0.5	<MDL	6	<MDL	16	57
Acenaphthylene	0.5	<MDL	4	<MDL	66	66
Phenanthrene	8.9		27		100	480
Fluorene	0.5	<MDL	6	<MDL	23	79
Anthracene	2.8		6	<MDL	220	1,200
2-Methylnaphthalene	2	<MDL	20	<MDL	38	64
Total LPAHs	17.2		89		370	780
HPAHs mg/Kg OC						
Fluoranthene	19		28		160	1,200
Pyrene	21		19		1,000	1,400
Benzo(a)anthracene	9.5		13		110	270
Chrysene	12		13		110	460
Total benzofluoranthenes	24		40	<MDL	230	450
Benzo(a)pyrene	8.9		10	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	2.9		10	<MDL	34	88
Dibenzo(a,h)anthracene	2	<MDL	20	<MDL	12	33
Benzo(g,h,i)perylene	2	<MDL	10	<MDL	31	78
Total HPAHs	101.3		163		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.5	<MDL	6	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.5	<MDL,G	6	<MDL,G	3.1	9
1,2,4-Trichlorobenzene	0.5	<MDL	6	<MDL	0.81	1.8
Hexachlorobenzene	0.5	<MDL	6	<MDL	0.38	2.3
Diethyl Phthalate	2	<MDL	10	<MDL	61	110
Dimethyl Phthalate	0.4	<MDL	3	<MDL	53	53
Di-N-Butyl Phthalate	10	B	10	<MDL,B	220	1,700
Benzyl Butyl Phthalate	0.5	<MDL	6	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	150		6	<MDL	47	78
Di-N-Octyl Phthalate	0.5	<MDL	6	<MDL	58	4,500
Dibenzofuran	2	<MDL	10	<MDL	15	58
Hexachlorobutadiene	2	<MDL	10	<MDL	3.9	6.2
N-Nitrosodiphenylamine	2	<MDL	10	<MDL	11	11
Total PCBs	257		6	<MDL	12	65
Dry weight µg/Kg						
Phenol	70	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	57	73
Benzoic Acid	70	<MDL	60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	1.3		0.024		0.41	0.59
Arsenic	14		9.4		57	93
Cadmium	1.4		0.2	<MDL	5.1	6.7
Chromium	60	E	13	E	260	270
Copper	71	B	11	B	390	390
Lead	150		5.9		450	530
Silver	12		0.4	<MDL	6.1	6.1
Zinc	190	B	47	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-11. N Core: 1992 Comparison to Sediment Standards, Below Cap and Sections N1 and N2

Section/Locator	N Below Cap LTBC34		N1 LTBC34		N2 LTBC34		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92		May 19, 92			
Sample Number	9201197		9201198		9201199			
% Solids	71		86		83		SQS	CSL
% TOC	2.5		1		1.7			
Parameters	Value	Qual	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC								
Naphthalene	2	<MDL	3	<MDL	2	<MDL	99	170
Acenaphthene	0.4	<MDL	1	<MDL	0.6	<MDL	16	57
Acenaphthylene	0.4	<MDL	0.8	<MDL	0.5	<MDL	66	66
Phenanthrene	9.2		1	<MDL	1.3		100	480
Fluorene	0.8		1	<MDL	0.6	<MDL	23	79
Anthracene	2.4		1	<MDL	0.6	<MDL	220	1,200
2-Methylnaphthalene	2	<MDL	3	<MDL	2	<MDL	38	64
Total LPAHs	17.2		10.8		7.6		370	780
HPAHs mg/Kg OC								
Fluoranthene	13		1	<MDL	2.2		160	1,200
Pyrene	15		2.1		2.7		1,000	1,400
Benzo(a)anthracene	6.8		1	<MDL	0.6	<MDL	110	270
Chrysene	8.4		1	<MDL	0.6	<MDL	110	460
Total benzofluoranthenes	23		6		4		230	450
Benzo(a)pyrene	9.6		2	<MDL	1	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	5.6		2	<MDL	1	<MDL	34	88
Dibenzo(a,h)anthracene	2	<RDL	3	<MDL	2	<MDL	12	33
Benzo(g,h,i)perylene	1	<MDL	2	<MDL	1	<MDL	31	78
Total HPAHs	84.6		20.1		15.1		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	0.4	<MDL	1	<MDL	0.6	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.4	<MDL	1	<MDL	0.6	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.4	<MDL	1	<MDL	0.6	<MDL	0.81	1.8
Hexachlorobenzene	0.4	<MDL	1	<MDL	0.6	<MDL	0.38	2.3
Diethyl Phthalate	1	<MDL	2	<MDL	1	<MDL	61	110
Dimethyl Phthalate	0.3	<MDL	0.6	<MDL	0.4	<MDL	53	53
Di-N-Butyl Phthalate	1	<MDL,B	2	<MDL,B	1	<RDL,B	220	1,700
Benzyl Butyl Phthalate	2.6		1	<MDL	0.6	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	52		3.3		0.6	<MDL	47	78
Di-N-Octyl Phthalate	0.4	<MDL	1	<MDL	0.6	<MDL	58	4,500
Dibenzofuran	1	<MDL	2	<MDL	1	<MDL	15	58
Hexachlorobutadiene	1	<MDL	2	<MDL	1	<MDL	3.9	6.2
N-Nitrosodiphenylamine	1	<MDL	2	<MDL	1	<MDL	11	11
Total PCBs	42.6		2	<MDL	1	<MDL	12	65
Dry weight µg/Kg								
Phenol	70	<MDL	60	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	20	<MDL	57	73
Benzoic Acid	70	<MDL	60	<MDL	60	<MDL	650	650
Metals mg/kg dry weight								
Mercury	1		0.035		0.024		0.41	0.59
Arsenic	11		7		8.4		57	93
Cadmium	1.1	L	0.23	L	0.12	L	5.1	6.7
Chromium	41		14		12		260	270
Copper	58	B	12	B	13	B	390	390
Lead	110	E,B	4.7	E,B	4.8	E,B	450	530
Silver	5.4		0.35		0.36		6.1	6.1
Zinc	110	B	45	B	45	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-11 (continued). N Core: 1992 Comparison to Sediment Standards, Sections N3 and N4

Section/Locator	N3 LTBC34		N4 LTBC34		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92			
Sample Number	9201200		9201201			
% Solids	75		86			
% TOC	2.4		0.4		SQS	CSL
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	2	<MDL	8	<MDL	99	170
Acenaphthene	0.4	<MDL	3	<MDL	16	57
Acenaphthylene	0.4	<MDL	2	<MDL	66	66
Phenanthrene	1.7		3	<MDL	100	480
Fluorene	0.4	<MDL	3	<MDL	23	79
Anthracene	0.4	<RDL	3	<MDL	220	1,200
2-Methylnaphthalene	2	<MDL	8	<MDL	38	64
Total LPAHs	7.3		30		370	780
HPAHs mg/Kg OC						
Fluoranthene	4.2		3	<MDL	160	1,200
Pyrene	3		3	<MDL	1,000	1,400
Benzo(a)anthracene	0.4	<MDL	3	<MDL	110	270
Chrysene	1.4		3	<MDL	110	460
Total benzofluoranthenes	4		16		230	450
Benzo(a)pyrene	1	<RDL	5	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	1	<MDL	5	<MDL	34	88
Dibenzo(a,h)anthracene	2	<MDL	8	<MDL	12	33
Benzo(g,h,i)perylene	1	<MDL	5	<MDL	31	78
Total HPAHs	18		51		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.4	<MDL	3	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.4	<MDL	3	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.4	<MDL	3	<MDL	0.81	1.8
Hexachlorobenzene	0.4	<MDL	3	<MDL	0.38	2.3
Diethyl Phthalate	1	<MDL	5	<MDL	61	110
Dimethyl Phthalate	0.3	<MDL	2	<MDL	53	53
Di-N-Butyl Phthalate	1	<MDL,B	5	<MDL,B	220	1,700
Benzyl Butyl Phthalate	0.4	<MDL	3	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	2.8		3	<MDL	47	78
Di-N-Octyl Phthalate	0.4	<MDL	3	<MDL	58	4,500
Dibenzofuran	1	<MDL	5	<MDL	15	58
Hexachlorobutadiene	1	<MDL	5	<MDL	3.9	6.2
N-Nitrosodiphenylamine	1	<MDL,B	5	<MDL,B	11	11
Total PCBs	0.8	<MDL	5	<MDL	12	65
Dry weight µg/Kg						
Phenol	70	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	57	73
Benzoic Acid	130		60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.027		0.023		0.41	0.59
Arsenic	9.3		7		57	93
Cadmium	0.27	L	0.12	L	5.1	6.7
Chromium	15		11		260	270
Copper	15	B	9.4	B	390	390
Lead	6.7	E,B	3.5	E,B	450	530
Silver	0.4		0.23		6.1	6.1
Zinc	51	B	38	B	410	960

Exceeds SQS   Exceeds CSL

TABLE 4-12. O Core: 1992 Comparison to Sediment Standards, Below Cap and Sections O1 and O2

Section/Locator	O Below Cap LTBC35		O1 LTBC35		O2 LTBC35		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92		May 19, 92			
Sample Number	9201189		9201190		9201191			
% Solids	75		86		87			
% TOC	3.3		1.4		1.5		SQS	CSL
Parameters	**Value**	**Qual**	**Value**	**Qual**	**Value**	**Qual**	**Table I**	**Table III**
LPAHs mg/Kg OC								
Naphthalene	1.2	<MDL	2	<MDL	2	<MDL	99	170
Acenaphthene	0.82		0.7	<MDL	0.7	<MDL	16	57
Acenaphthylene	0.94		0.6	<MDL	0.5	<MDL	66	66
Phenanthrene	13		0.7	<MDL	0.7	<MDL	100	480
Fluorene	1.1		0.7	<MDL	0.7	<MDL	23	79
Anthracene	7.3		0.7	<MDL	0.7	<MDL	220	1,200
2-Methylnaphthalene	1	<MDL	2	<MDL	2	<MDL	38	64
Total LPAHs	25.36		7.4		7.3		370	780
HPAHs mg/Kg OC								
Fluoranthene	23		0.7	<MDL	0.7	<MDL	160	1,200
Pyrene	17		0.7	<MDL	0.7	<MDL	1,000	1,400
Benzo(a)anthracene	12		0.7	<MDL	0.7	<MDL	110	270
Chrysene	16		0.7	<MDL	0.7	<MDL	110	460
Total benzofluoranthenes	43		4		4		230	450
Benzo(a)pyrene	14		1	<MDL	1	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	0.9	<MDL	1	<MDL	1	<MDL	34	88
Dibenzo(a,h)anthracene	1	<MDL	2	<MDL	2	<MDL	12	33
Benzo(g,h,i)perylene	0.9	<MDL	1	<MDL	1	<MDL	31	78
Total HPAHs	127.8		11.8		11.8		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	0.3	<MDL	0.7	<MDL	0.7	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.3	<MDL	0.7	<MDL	0.7	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.3	<MDL	0.7	<MDL	0.7	<MDL	0.81	1.8
Hexachlorobenzene	0.3	<MDL	0.7	<MDL	0.7	<MDL	0.38	2.3
Diethyl Phthalate	0.9	<MDL	1	<MDL	1	<MDL	61	110
Dimethyl Phthalate	0.2	<MDL	0.4	<MDL	0.4	<MDL	53	53
Di-N-Butyl Phthalate	0.9	<MDL,B	1	<MDL,B	1	<MDL,B	220	1,700
Benzyl Butyl Phthalate	2.9		0.7	<MDL	0.7	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	39		0.7	<MDL	0.7	<MDL	47	78
Di-N-Octyl Phthalate	0.3	<MDL	0.7	<MDL	0.7	<MDL	58	4,500
Dibenzofuran	0.9	<MDL	1	<MDL	1	<MDL	15	58
Hexachlorobutadiene	0.9	<MDL	1	<MDL	1	<MDL	3.9	6.2
N-Nitrosodiphenylamine	0.9	<MDL	1	<MDL	1	<MDL	11	11
Total PCBs	9.9		1	<MDL	1	<MDL	12	65
Dry weight µg/Kg								
Phenol	70	<MDL	60	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	20	<MDL	57	73
Benzoic Acid	70	<MDL	60	<MDL	60	<MDL	650	650
Metals mg/kg dry weight								
Mercury	0.37		0.023		0.02	<MDL	0.41	0.59
Arsenic	12		7		8		57	93
Cadmium	0.84	L	0.093	L	0.11	L	5.1	6.7
Chromium	32		11		11		260	270
Copper	48	B	12	B	11	B	390	390
Lead	81	E,B	3.5	E,B	3.4	E,B	450	530
Silver	3.6		0.35		0.23		6.1	6.1
Zinc	91	B	41	B	40	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-12 (continued). O Core: 1992 Comparison to Sediment Standards, Sections O3 and O4

Section/Locator	O3 LTBC35		O4 LTBC35		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92			
Sample Number	9201192		9201193			
% Solids	82		79			
% TOC	0.77		1.4		SQS	CSL
Parameters	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC						
Naphthalene	5	<MDL	3	<MDL	99	170
Acenaphthene	1	<MDL	0.7	<MDL	16	57
Acenaphthylene	1	<MDL	0.6	<MDL	66	66
Phenanthrene	1	<MDL	4.2		100	480
Fluorene	1	<MDL	0.7	<MDL	23	79
Anthracene	1	<MDL	0.7	<MDL	220	1,200
2-Methylnaphthalene	5	<MDL	3	<MDL	38	64
Total LPAHs	15		12.9		370	780
HPAHs mg/Kg OC						
Fluoranthene	1	<MDL	11		160	1,200
Pyrene	1	<MDL	5.1		1,000	1,400
Benzo(a)anthracene	1	<MDL	2.8		110	270
Chrysene	1	<MDL	5.7		110	460
Total benzofluoranthenes	10		7		230	450
Benzo(a)pyrene	3	<MDL	3.3		99	210
Indeno(1,2,3-Cd)Pyrene	3	<MDL	2	<MDL	34	88
Dibenzo(a,h)anthracene	5	<MDL	3	<MDL	12	33
Benzo(g,h,i)perylene	3	<MDL	2	<MDL	31	78
Total HPAHs	28		41.9		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	1	<MDL	0.7	<MDL	2.3	2.3
1,4-Dichlorobenzene	1	<MDL	0.7	<MDL	3.1	9
1,2,4-Trichlorobenzene	1	<MDL	0.7	<MDL	0.81	1.8
Hexachlorobenzene	1	<MDL	0.7	<MDL	0.38	2.3
Diethyl Phthalate	3	<MDL	2	<MDL	61	110
Dimethyl Phthalate	0.8	<MDL	0.4	<MDL	53	53
Di-N-Butyl Phthalate	3	<MDL,B	2	<MDL,B	220	1,700
Benzyl Butyl Phthalate	1	<MDL	0.7	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	1	<MDL	0.7	<MDL	47	78
Di-N-Octyl Phthalate	1	<MDL	0.7	<MDL	58	4,500
Dibenzofuran	3	<MDL	2	<MDL	15	58
Hexachlorobutadiene	3	<MDL	2	<MDL	3.9	6.2
N-Nitrosodiphenylamine	3	<MDL	2	<MDL	11	11
Total PCBs	3	<MDL	1	<MDL	12	65
Dry weight µg/Kg						
Phenol	60	<MDL	60	<MDL	420	1,200
2-Methylphenol	20	<MDL	30	<MDL	63	63
4-Methylphenol	20	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	20	<MDL	30	<MDL	29	29
Pentachlorophenol	20	<MDL	30	<MDL	360	690
Benzyl Alcohol	20	<MDL	30	<MDL	57	73
Benzoic Acid	60	<MDL	60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.024		0.063		0.41	0.59
Arsenic	7.3		6.3		57	93
Cadmium	0.12	L	0.13	L	5.1	6.7
Chromium	13		14		260	270
Copper	12	B	14	B	390	390
Lead	3.7	E,B	8	E,B	450	530
Silver	0.24		0.51		6.1	6.1
Zinc	46	B	48	B	410	960

Exceeds SQS — Exceeds CSL

TABLE 4-13. P Core: 1992 Comparison to Sediment Standards, Below Cap and Section P1

Section/Locator	P Below Cap LTBD24		P1 LTBD24		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92			
Sample Number	9201205		9201206			
% Solids	65		75		SQS Table I	CSL Table III
% TOC	4.3		1.1			
Parameters	Value	Qual	Value	Qual		
LPAHs mg/Kg OC						
Naphthalene	1	<RDL	4	<MDL	99	170
Acenaphthene	1.2		0.9	<MDL	16	57
Acenaphthylene	1.2		0.8	<MDL	66	66
Phenanthrene	8.6		0.9	<MDL	100	480
Fluorene	1.5		0.9	<MDL	23	79
Anthracene	2.3		0.9	<MDL	220	1,200
2-Methylnaphthalene	1	<MDL	4	<MDL	38	64
Total LPAHs	16.8		12.4		370	780
HPAHs mg/Kg OC						
Fluoranthene	13		0.9	<MDL	160	1,200
Pyrene	23		0.9	<MDL	1,000	1,400
Benzo(a)anthracene	8.6		0.9	<MDL	110	270
Chrysene	12		0.9	<MDL	110	460
Total benzofluoranthenes	37		8		230	450
Benzo(a)pyrene	13		3	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	5.1		3	<MDL	34	88
Dibenzo(a,h)anthracene	1	<MDL	4	<MDL	12	33
Benzo(g,h,i)perylene	5.3		3	<MDL	31	78
Total HPAHs	118		24.6		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.2	<MDL	0.9	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.2	<MDL	0.9	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.2	<MDL	0.9	<MDL	0.81	1.8
Hexachlorobenzene	0.2	<MDL	0.9	<MDL	0.38	2.3
Diethyl Phthalate	0.7	<MDL	3	<MDL	61	110
Dimethyl Phthalate	0.2	<MDL	0.6	<MDL	53	53
Di-N-Butyl Phthalate	0.7	<MDL,B	3	<MDL,B	220	1,700
Benzyl Butyl Phthalate	0.2	<MDL	0.9	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	98		0.9	<MDL	47	78
Di-N-Octyl Phthalate	0.2	<MDL	0.9	<MDL	58	4,500
Dibenzofuran	0.7	<MDL	3	<MDL	15	58
Hexachlorobutadiene	0.7	<MDL	3	<MDL	3.9	6.2
N-Nitrosodiphenylamine	0.7	<MDL,B	3	<MDL,B	11	11
Total PCBs	32.7		2	<MDL	12	65
Dry weight µg/Kg						
Phenol	80	<MDL	70	<MDL	420	1,200
2-Methylphenol	30	<MDL	30	<MDL	63	63
4-Methylphenol	30	<MDL	30	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	30	<MDL	29	29
Pentachlorophenol	30	<MDL	30	<MDL	360	690
Benzyl Alcohol	30	<MDL	30	<MDL	57	73
Benzoic Acid	80	<MDL	70	<MDL	650	650
Metals mg/kg dry weight						
Mercury	1		0.03	<MDL	0.41	0.59
Arsenic	12		8		57	93
Cadmium	2.5	L	0.13	L	5.1	6.7
Chromium	51		12		260	270
Copper	80	B	13	B	390	390
Lead	150	E,B	8.4	E,B	450	530
Silver	7.2		0.27		6.1	6.1
Zinc	250	B	49	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-14. Core Replicates: 1992 Comparison to Sediment Standards, Below Cap and Section N1

Section/Locator	N Below Cap LTBC34		N1 LTBC34		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92			
Sample Number	9201202		9201203			
% Solids	49		83			
% TOC	4.4		1.5			
Parameters	Value	Qual	Value	Qual	SQS Table I	CSL Table III
LPAHs mg/Kg OC						
Naphthalene	1	<MDL	3	<MDL	99	170
Acenaphthene	0.5	<RDL	0.7	<MDL	16	57
Acenaphthylene	0.75		0.5	<MDL	66	66
Phenanthrene	6.1		0.7	<MDL	100	480
Fluorene	0.89		0.7	<MDL	23	79
Anthracene	1.8		0.7	<MDL	220	1,200
2-Methylnaphthalene	1	<MDL	3	<MDL	38	64
Total LPAHs	12.04		9.3		370	780
HPAHs mg/Kg OC						
Fluoranthene	20		0.7	<MDL	160	1,200
Pyrene	11		2.3		1,000	1,400
Benzo(a)anthracene	4.5		0.7	<MDL	110	270
Chrysene	4.3		0.7	<MDL	110	460
Total benzofluoranthenes	15.9		6		230	450
Benzo(a)pyrene	8		1	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	3		1	<MDL	34	88
Dibenzo(a,h)anthracene	1	<MDL	3	<MDL	12	33
Benzo(g,h,i)perylene	2.7		1	<MDL	31	78
Total HPAHs	70.4		16.4		960	5,300
mg/Kg OC						
1,2-Dichlorobenzene	0.5	<MDL	0.7	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.5	<MDL	0.7	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.5	<MDL	0.7	<MDL	0.81	1.8
Hexachlorobenzene	0.5	<MDL	0.7	<MDL	0.38	2.3
Diethyl Phthalate	0.9	<MDL	1	<MDL	61	110
Dimethyl Phthalate	0.2	<MDL	0.4	<MDL	53	53
Di-N-Butyl Phthalate	0.9	<MDL,B	1	<MDL,B	220	1,700
Benzyl Butyl Phthalate	0.5	<MDL	0.7	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	70		0.7	<MDL	47	78
Di-N-Octyl Phthalate	0.5	<MDL	0.7	<MDL	58	4,500
Dibenzofuran	0.9	<MDL	1	<MDL	15	58
Hexachlorobutadiene	0.9	<MDL	1	<MDL	3.9	6.2
N-Nitrosodiphenylamine	0.9	<MDL,B	1	<MDL,B	11	11
Total PCBs	26.8		1	<MDL	12	65
Dry weight µg/Kg						
Phenol	100	<MDL	60	<MDL	420	1,200
2-Methylphenol	40	<MDL	20	<MDL	63	63
4-Methylphenol	40	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	40	<MDL	20	<MDL	29	29
Pentachlorophenol	40	<MDL	20	<MDL	360	690
Benzyl Alcohol	40	<MDL	20	<MDL	57	73
Benzoic Acid	100	<MDL	60	<MDL	650	650
Metals mg/kg dry weight						
Mercury	0.55		0.02	<MDL	0.41	0.59
Arsenic	14		7.2		57	93
Cadmium	1.3	L	0.12	L	5.1	6.7
Chromium	55		12		260	270
Copper	57	B	11	B	390	390
Lead	92	E,B	8.1	E,B	450	530
Silver	4.7		0.36		6.1	6.1
Zinc	240	B	46	B	410	960

Exceeds SQS | Exceeds CSL

TABLE 4-14 (continued). Core Replicates: 1992 Comparison to Sediment Standards, Below Cap and Sections O1 and O2

Section/Locator	O Below Cap LTBC35		O1 LTBC35		O2 LTBC35		Marine Sediment Standards	
Date Sampled	May 19, 92		May 19, 92		May 19, 92			
Sample Number	9201194		9201195		9201196			
% Solids	75		84		85			
% TOC	3.6		1.3		0.84		SQS	CSL
Parameters	Value	Qual	Value	Qual	Value	Qual	Table I	Table III
LPAHs mg/Kg OC								
Naphthalene	1	<MDL	3	<MDL	5	<MDL	99	170
Acenaphthene	0.69		0.8	<MDL	1	<MDL	16	57
Acenaphthylene	1.1		4.7		1	<MDL	66	66
Phenanthrene	11		42		1	<MDL	100	480
Fluorene	1.3		3.7		1	<MDL	23	79
Anthracene	5.3		8.5		1	<MDL	220	1,200
2-Methylnaphthalene	1	<MDL	3	<MDL	5	<MDL	38	64
Total LPAHs	21.39		65.7		15		370	780
HPAHs mg/Kg OC								
Fluoranthene	0.3	<MDL	37		1	<MDL	160	1,200
Pyrene	16		44		1	<MDL	1,000	1,400
Benzo(a)anthracene	9.7		13		1	<MDL	110	270
Chrysene	13		15		1	<MDL	110	460
Total benzofluoranthenes	29.9		20.7		10		230	450
Benzo(a)pyrene	11		11		2	<MDL	99	210
Indeno(1,2,3-Cd)Pyrene	4.7		7.5		2	<MDL	34	88
Dibenzo(a,h)anthracene	1	<RDL	3	<MDL	5	<MDL	12	33
Benzo(g,h,i)perylene	5.3		10		2	<MDL	31	78
Total HPAHs	90.9		161.2		25		960	5,300
mg/Kg OC								
1,2-Dichlorobenzene	0.3	<MDL	0.8	<MDL	1	<MDL	2.3	2.3
1,4-Dichlorobenzene	0.3	<MDL	0.8	<MDL	1	<MDL	3.1	9
1,2,4-Trichlorobenzene	0.3	<MDL	0.8	<MDL	1	<MDL	0.81	1.8
Hexachlorobenzene	0.3	<MDL	0.8	<MDL	1	<MDL	0.38	2.3
Diethyl Phthalate	0.8	<MDL	2	<MDL	2	<MDL	61	110
Dimethyl Phthalate	0.2	<MDL	0.5	<MDL	0.7	<MDL	53	53
Di-N-Butyl Phthalate	0.8	<MDL,B	2	<MDL,B	2	<MDL,B	220	1,700
Benzyl Butyl Phthalate	3.1		0.8	<MDL	1	<MDL	4.9	64
Bis(2-Ethylhexyl)Phthalate	42		0.8	<MDL	1	<MDL	47	78
Di-N-Octyl Phthalate	0.3	<MDL	0.8	<MDL	1	<MDL	58	4,500
Dibenzofuran	0.8	<MDL	2	<RDL	2	<MDL	15	58
Hexachlorobutadiene	0.8	<MDL	2	<MDL	2	<MDL	3.9	6.2
N-Nitrosodiphenylamine	0.8	<MDL	2	<MDL	2	<MDL	11	11
Total PCBs	9.7		2	<MDL	2	<MDL	12	65
Dry weight µg/Kg								
Phenol	70	<MDL	60	<MDL	60	<MDL	420	1,200
2-Methylphenol	30	<MDL	20	<MDL	20	<MDL	63	63
4-Methylphenol	30	<MDL	20	<MDL	20	<MDL	670	670
2,4-Dimethylphenol	30	<MDL	20	<MDL	20	<MDL	29	29
Pentachlorophenol	30	<MDL	20	<MDL	20	<MDL	360	690
Benzyl Alcohol	30	<MDL	20	<MDL	20	<MDL	57	73
Benzoic Acid	70	<MDL	60	<MDL	60	<MDL	650	650
Metals mg/kg dry weight								
Mercury	0.33		0.024		0.02	<MDL	0.41	0.59
Arsenic	12		7.1		7.1		57	93
Cadmium	1.1	L	0.12	L	0.1	<MDL,L	5.1	6.7
Chromium	37		14		13		260	270
Copper	79	B	12	B	11	B	390	390
Lead	120	E,B	8.6	E,B	3.5	E,B	450	530
Silver	5.1		0.36		0.24		6.1	6.1
Zinc	120	B	45	B	46	B	410	960

Exceeds SQS | Exceeds CSL